SOUTHERN POWER AND INDUSTRY

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JUNE, 1954

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ALLIS-CHALMERS
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Fan-Cooled
MOTORS

INDOORS or OUT

DIRT and CORROSION

Can't Hurt These Motors

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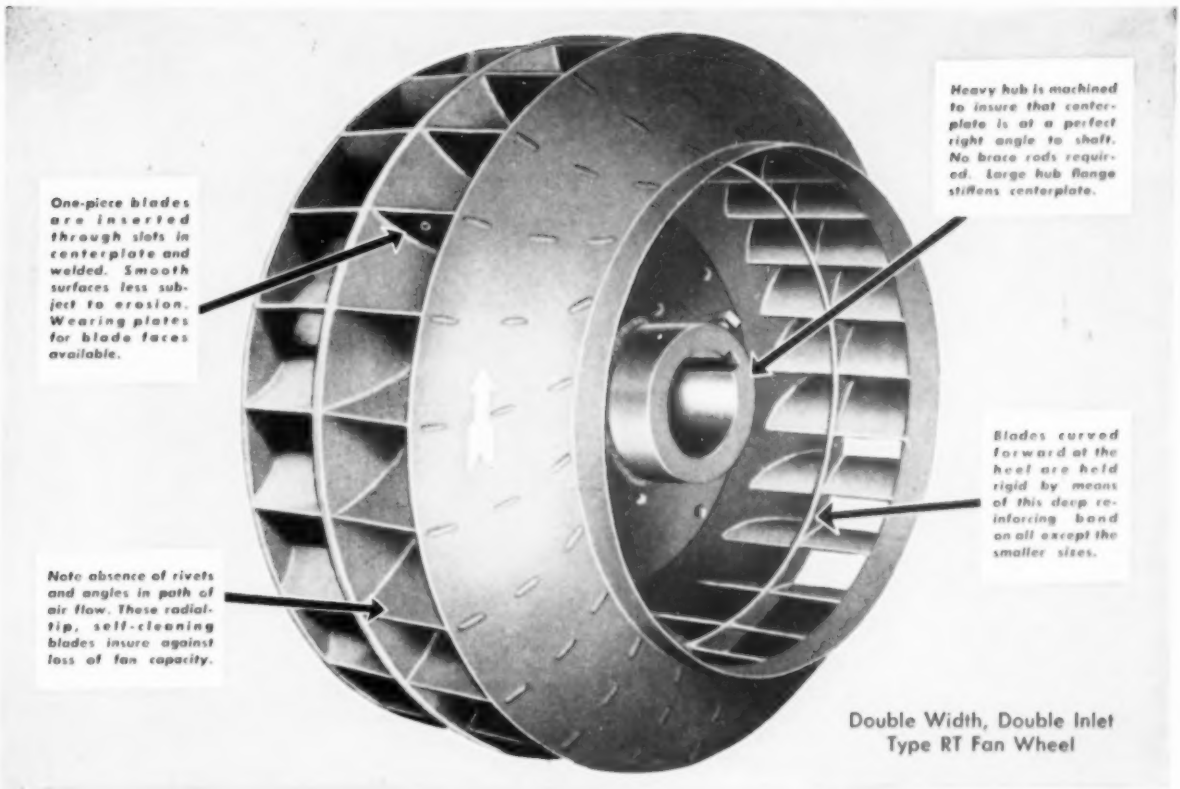
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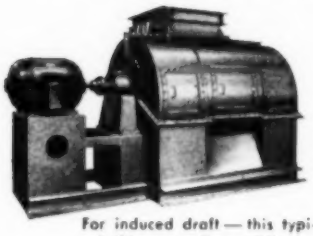
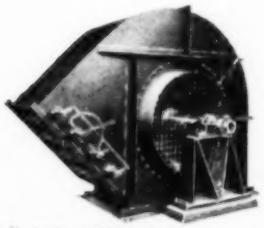


For induced draft — this typical Clarage Type RT fan.



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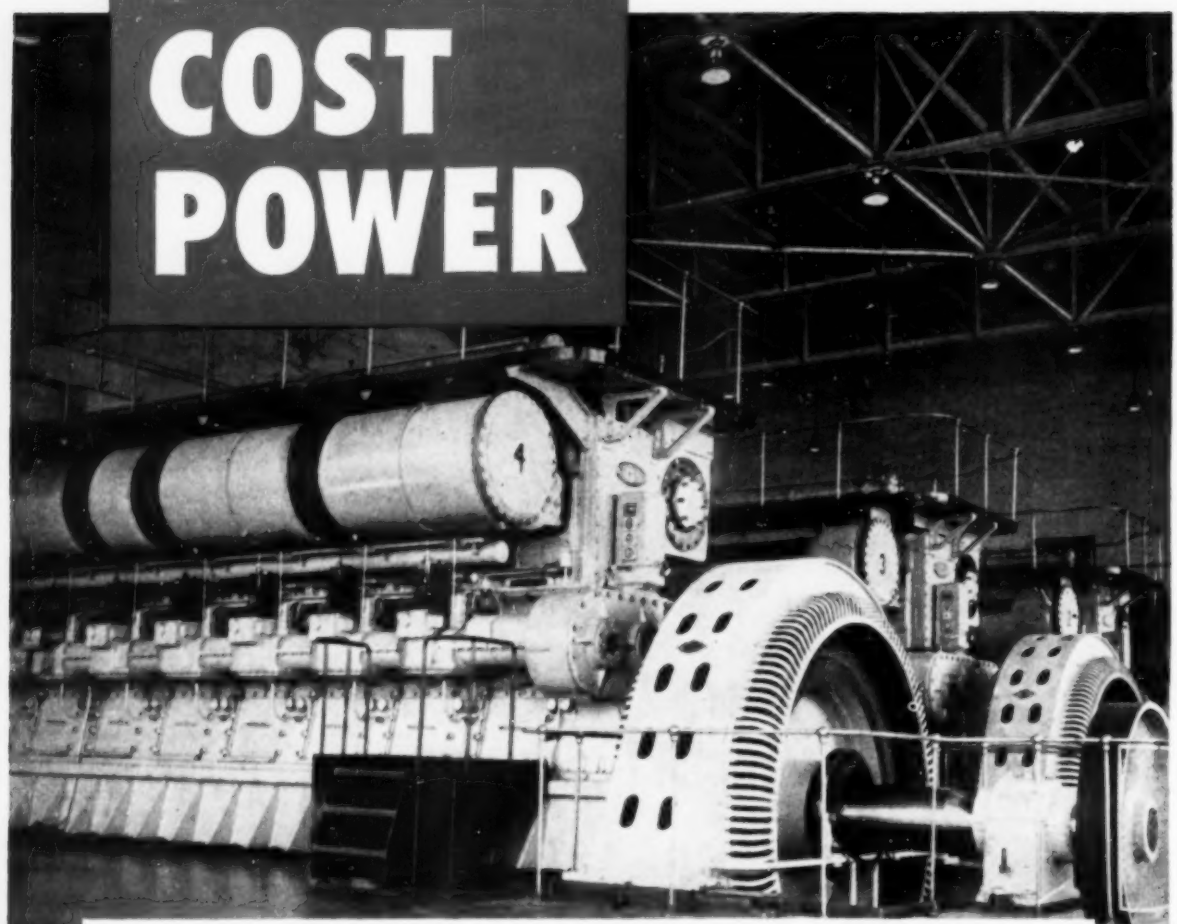

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SOUTHERN POWER AND INDUSTRY

Vol. 72
No. 6

JUNE
1954

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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

June, 1954

► "YOU MADE IT! NOW USE IT!" applies to nearly every detail of the electrical distribution system in the new $25 million G.E. transformer manufacturing plant in Rome, Georgia.

General Electric's prescription for a safe, efficient and flexible distribution system includes load-center distribution, unit substations, higher voltages, interlocked armor cable and plug-in busway, capacitors, and combined power and lighting circuits.

At the highly mechanized Rome, Georgia, plant they followed this prescription exactly in the design and application of equipment. Check the details in this issue of SP&I as discussed by H. E. Heddesheimer, Supervisor of Manufacturing Facilities at the Georgia plant.

► NEW POLE-TYPE REGULATORS are the equivalent of station regulators in construction and service, according to Allis-Chalmers transformer engineers. Convinced that there are many utilities not fully aware of the potentialities of distribution type feeder-voltage regulators, A-C is delivering upon request to any recognized distribution system a JFR (pole-type) regulator for 30 day inspection without cost.

► COSTS OF FASTENING DRIVE PINS and threaded studs into steel or cement have been cut in half at Glenn L. Martin's maintenance operations in Baltimore through the use of powder-actuated tools and fasteners. More than 30,000 fasteners were used by Martin maintenance people last year on jobs as widely varied as installing steel rails for flying boat assembly lines to erecting a wooden "security" fence around classified government work.

Maintenance superintendent Adam Scepaniak says that you have to have one of the tools for several months before understanding its potentialities. As soon as the maintenance men realize how much tedious drilling can be saved, they figure out more uses for it than are listed in the book.

► SANDING PROBLEMS? Nonclogging open-mesh abrasive material--Sand Screen by Carborundum--is designed especially for sanding operations where loading or glazing is a problem. Screen-like abrasive, coated uniformly on both sides with silicon carbide grain, permits sanding residue to flow freely through the open meshes. Claimed to give 7 to 15 times longer life than conventional coated abrasives, Sand Screen can be used wet or dry, for both machine and hand sanding operations.

► LABELING AND PROTECTIVE TAPE that sticks to OILY METAL SURFACES as well as dry, is an interesting development by Labelon Tape. Their pressure-sensitive tape (Oil-Stik), has a special adhesive that combines with oil to produce a firm bond, yet permits the tape to be stripped off any time without leaving a mark. Tape has a writing surface suitable for pencil, ink or crayon.

(Continued on page 6)

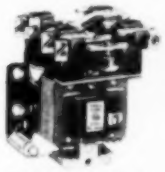
A-C & D-C TROUBLE FREE RELAYS

from 1 to 12 POLES

THE UTMOST IN RELAY DEPENDABILITY

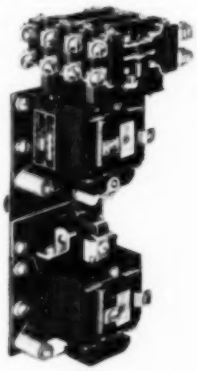
HUM-FREE A-C RELAYS

Relays in hospitals, churches, etc., must be hum-free. For these places, Types BM and BXL relays are recommended. Continuous coil currents are not needed to hold them closed. Also useful for machine tools.



TYPE BM—Residual Magnetic Latch

Contacts are held closed by residual magnetism of core. A demagnetizing coil current opens relay.



TYPE BXL—Mechanical Latch 2-Unit Relay

Lower solenoid trips the mechanical latch of the upper relay to open the upper relay contacts.

Bulletin 700 Relays are built to the same critical operating standards as the larger switching units in the Allen-Bradley line.

They have only one moving part . . . the simple solenoid plunger that opens and closes the double break, silver alloy contacts. Available in many varieties of contact arrangements . . . up to 12 poles . . . with or without enclosures. Long, trouble free life makes these relays the ideal pilot controls for installations which are likely to get infrequent inspection and maintenance.

Send for Bulletin 700 containing complete details on ratings, dimensions, and related accessories.

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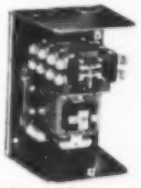
TYPICAL RELAYS in the ALLEN-BRADLEY LINE



Relay in Enclosure

8 Pole A-C Relay

3-Wire Thermostat Relay

Low Current A-C Relay

D-C Relay

Bulletin 709 Size 3 Solenoid Starter

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TULSA—John W. Elder, 1526 East Fourth St., Tel: 3-9149

facts and trends (continued from page 4)

► INDUCTOR EXCITATION SYSTEM developed by Allis-Chalmers eliminates brushes and commutator of the conventional exciter and all rotating windings. An inductor alternator has been substituted for the usual d-c machine. Consequently, two big causes of turbine generator outages--commutator maintenance and brush replacement--have been eliminated.

Heart of the Allis-Chalmers system, available as original equipment or for modernization of older generators, is the 360 cycle inductor generator (no rotor windings, commutator or slip rings). As the fluted rotor in the inductor generator rotates, reluctance in the flux path between stator pole face varies. This variation induces a 360 cycle current in the alternating current exciter field. This output is converted to direct current by a selenium rectifier.

► INTERNAL FIN TUBING BY EXTRUSION is a Babcock & Wilcox development that has passed the experimental stage. Surface area is greatly increased thus permitting a greater transfer of heat in a tube of a given length and diameter.

► TRANSFORMER COILS are being produced by a new high-speed automatic technique resulting in wafer shaped coils which resemble miniature life preservers. Traditional method of producing coils involves the winding of copper wire on cardboard cores.

In the new Sylvania Electric Products technique, a roll of metal foil and insulating paper is sliced quickly into coils of any desired width and the wafers are ready for immediate use in transformer production. Method combines important key advantages for automatic production and greater flexibility in the design of electrical equipment.

► TAMING OF DIESEL ENGINE EXHAUSTS by Oxy-Catalyst's catalytic muffler will permit more widespread use of 4-cycle diesel equipment underground or in enclosed plant areas. A new exhaust control unit for 2-cycle diesel engines is being developed. Device attaches directly to the engine exhaust manifold and burns, by catalytic action, the noxious carbon monoxide and odorous hydrocarbon fumes in exhaust gases.

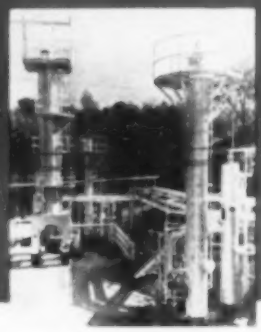
► USING STEAM TRACED PIPING? Interesting solution by Alcoa to the problem of applying heat to product piping is Unitrace, an integrally extruded steam traced aluminum pipe, slightly oval in cross section because of the crescent-shaped steam passage adjacent to the product line.

New piping lends itself readily to shop fabrication of standard lengths. Can be formed easily using conduit tools. Unitrace advantages include lower labor and insulation costs, as well as the possibility of omitting thermal insulation entirely.

► USE OF GAS TURBINES to move gas by centrifugal compression is a recent development for the gas industry. The oldest such installation has been in operation only since 1948. Advantages include flexibility of speed at full load conditions, low building space requirements, push button station control, low maintenance costs, less operating supervision and less piping vibration and pulsation.

Since November 1953, a gas turbine driven centrifugal compressor at Napoleonville, La., has been providing the initial boost for gas transported in United Gas Pipe Line Company's 30 in. main line from South Louisiana to Kosciusko, Miss. Automatic control is the big feature--in a matter of 15 minutes, unit can be put in service by energizing one master control switch.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.



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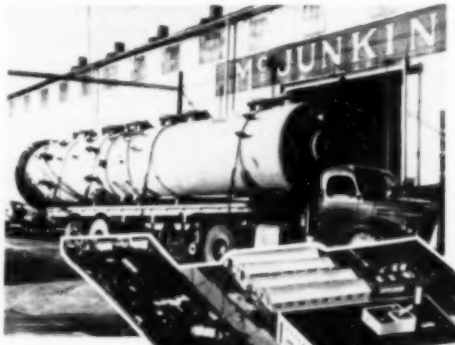

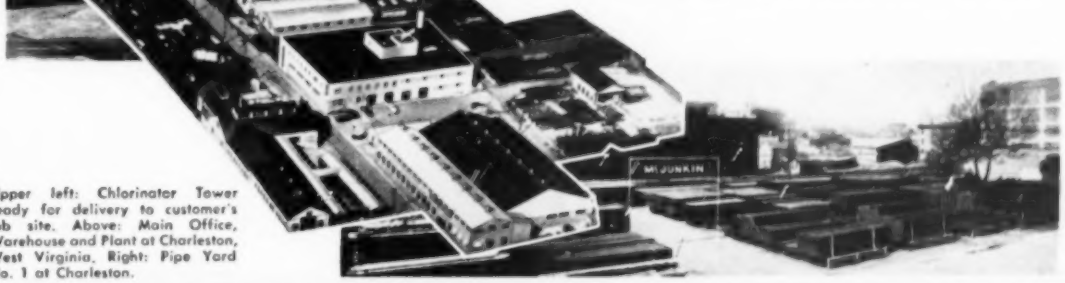

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Upper left: Chlorinator Tower ready for delivery to customer's job site. Above: Main Office, Warehouse and Plant at Charleston, West Virginia. Right: Pipe Yard No. 1 at Charleston.

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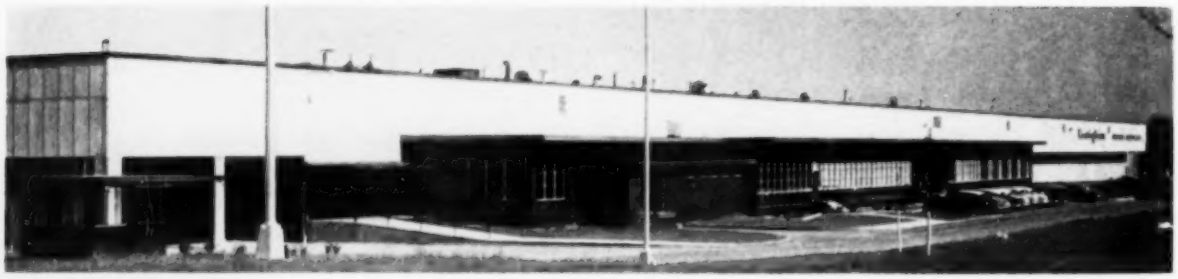
NEWS *for the South and Southwest*



Westinghouse Dedicates Lighting Plant—Vicksburg, Miss.

A lot of lighting fixtures will be streaming forth from this new plant built by Westinghouse at Vicksburg, Mississippi. Mississippi Governor Hugh White and Westinghouse President Gwilym A. Price of Pittsburgh, Pa., officiated at the formal dedication of the multi-million dollar plant in May. This view shows the 900 ft long front of the plant, which boasts more than 300,000 sq ft of production space.

The Mississippi plant is expected to have a payroll of more than two million dollars and will eventually employ from 500 to 800 people. Monthly production should average 35,000 units—enough to stretch from the plant to the state capitol—40 miles away. The new plant is part of the company's lighting division which has headquarters at Cleveland, Ohio, and produces fluorescent lighting fixtures for industrial and commercial use. Mr. Don E. Jenkins, photograph at left, is manager of the Vicksburg, Mississippi, plant.

Duke Power Company's New Officers & Directors

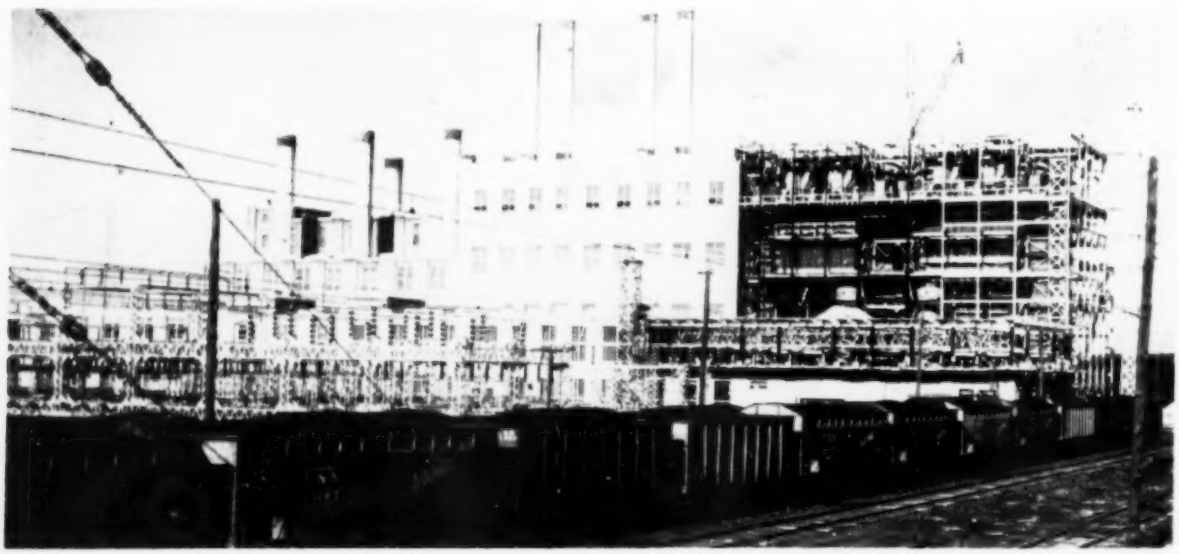
Officers and directors of DUKE POWER COMPANY were reelected and four new vice presidents were named at a recent meeting of the company's Board of Directors.

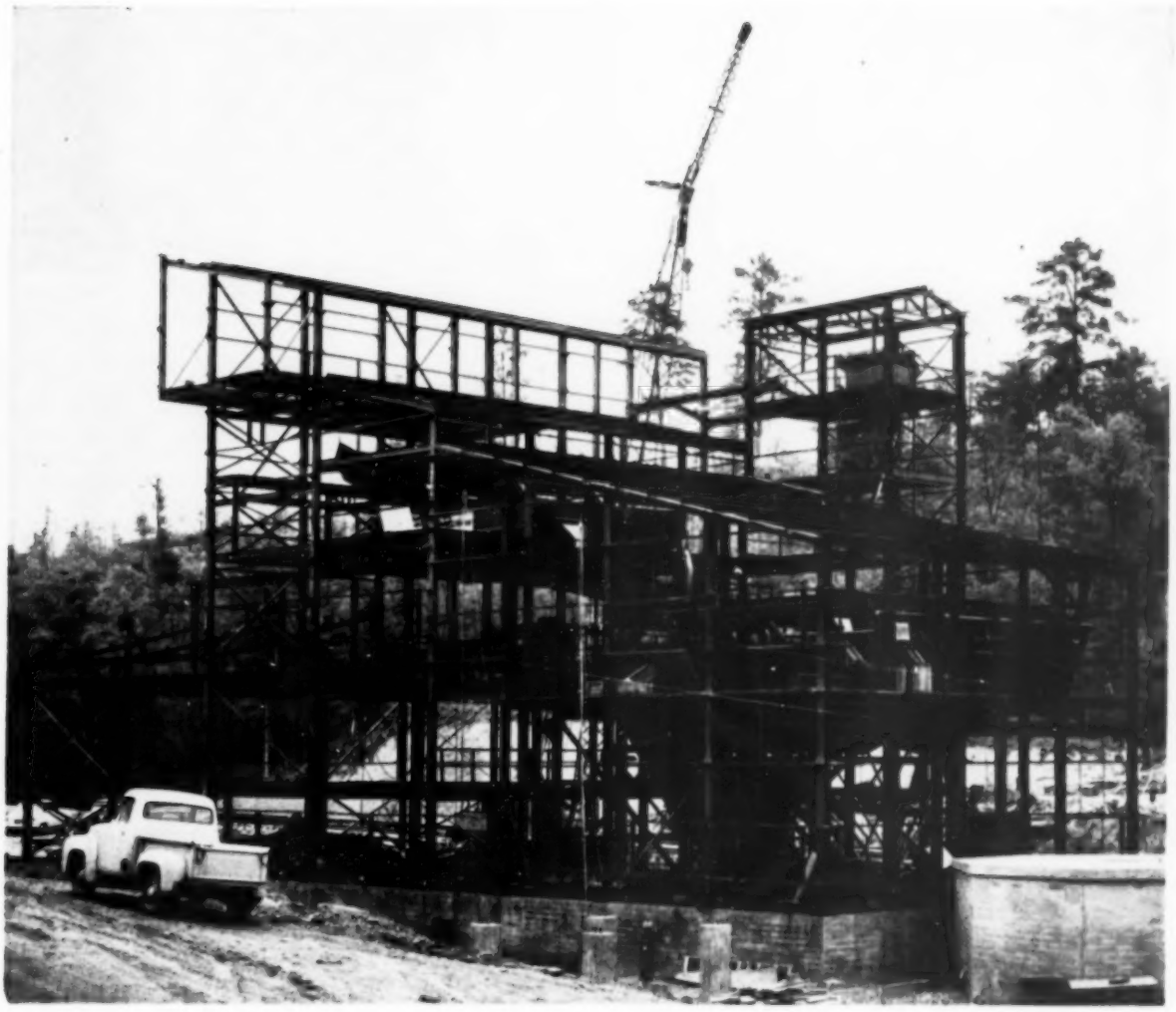
The new vice presidents, all of Charlotte, are ED E. WILLIAMS, superintendent of the company's Steam Division; DAVID NABOW, chief engineer; MARSHALL E. LAKE, manager of the Mill Power Department and JOHN PAUL LUCAS, JR., director of advertising and public relations.

Reelected at the meeting were G. G. ALLEN of New York, chairman of the Board; NORMAN A. COCKE, president, and W. S. O'B. ROBINSON, JR., vice chairman of the Board and chairman of its executive committee, both of Charlotte; and W. C. PARKER of New

(*Continued on page* 10)

DUKE POWER COMPANY'S Riverbend steam-electric generating station on the Catawba River near Charlotte. When work is completed late this year on two new units, the plant will have a continuous capability of 665,000 kilowatts and will be the largest in the Southeast.





Preparation Plant, Maxine Mine

Coal Mining—modern style

Alabama By-Products Corporation is building a modern preparation plant at its new, highly mechanized Maxine coal mine. Coal from this mine goes largely to steam plants of the Southern Company group.

To build this plant ABC called on O'Neal to fabricate the steel. ABC has been buying steel from O'Neal since the corporation was formed.

O'NEAL STEEL WORKS

Birmingham, 2, Ala.

O'NEAL STEEL

Mr. Williams Mr. Lucas Mr. Nabow Mr. Lake Mr. Otinger Mr. Wanzer Mr. Wolf

News (continued)

(*Starts on page* 8)

York, secretary-treasurer.

Others renamed at the meeting of the Board were: O. J. MILLER, vice president and general manager; C. S. REED, vice president and rate engineer; THOMAS F. HILL, vice president and supervisor of branches, all of Charlotte; ALEX. H. SANDS, JR., of New York, assistant secretary; L. H. ADAMS, J. S. SEASE, and D. C. CARMICHAEL, all of Charlotte, assistant secretaries; E. R. BUCHER, E. E. WAYLAND, and J. B. HALLIBURTON, all of Charlotte, assistant treasurers; and VANCE HUGGINS of Charlotte, comptroller.

Personnel Changes

Announced at the same time from the office of Mr. Miller were the following changes in key personnel: H. W. OETINGER, engineer with the company since 1927, to the position of Executive Assistant; C. T. WANZER, construction engineer with the company since 1918, to the position of Construction Manager; and H. B. WOLF, who has served in a number of departments since coming with the company in 1916, to the position of Manager of Operations. Each of these men is widely recognized by the industry.

Each of the new vice presidents has been prominently identified with Duke Power Company. Mr. Nabow, chief engineer, joined the company 37 years ago and has established a national reputation as an engineer, particularly for his work in steam-electric plant design. He is a graduate of Columbia University with the degree of Civil Engineer.

Mr. Nabow is a member of the American Society of Mechanical Engineers, and the North Carolina Society of Engineers. He has been awarded the highest award of the NCSE for accomplishments in steam-electric station design.

Mr. Williams, who joined Duke Power Company in 1924, is a native of Alabama and a graduate of Georgia Tech in Electrical Engineering. Before coming to Duke, he was municipal superintendent at Greenville, N. C. He is a fellow of the American Society of Engineers, a member of Tau Beta Pi, Pi Tau Sigma, has been a manager and vice president of the American Society of Mechanical Engineers, a member of the North Carolina Society of Engineers, and a life member of the Charlotte Engineers Club.

Mr. Lake is a native of Washington, D. C., and a graduate of the University of North Carolina in Electrical Engineering. He joined Duke Power Company in 1922 and was appointed manager of its Mill Power Department in 1944. He was one of the founders and later chairman of the North Carolina Section of the American Institute of Electrical Engineers. He is a past president of the Charlotte Engineers Club and has served as a director of the North Carolina Society of Engineers. Mr. Lake is a former chairman of the Charlotte School Board, a Rotarian, and a member of the governing boards of the Charlotte Y.M.C.A. and the Salvation Army.

Mr. Nabow, Mr. Williams, and Mr. Lake were elected directors of the company in 1946.

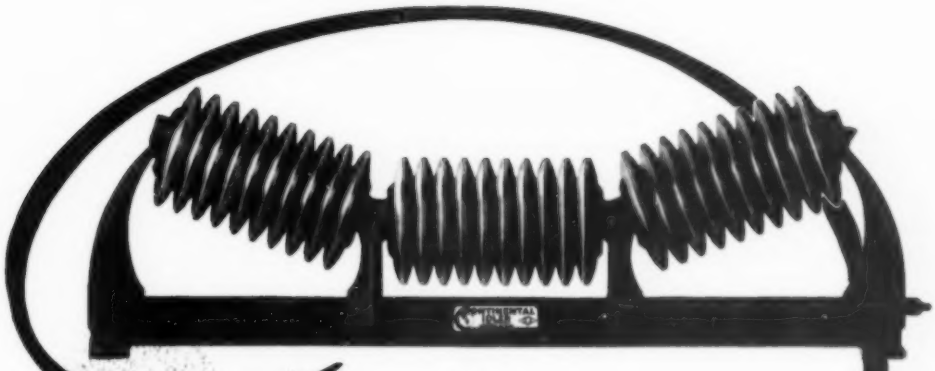
Mr. Lucas, a graduate of Duke University, joined the company in 1940, succeeding his father, the late John Paul Lucas, Sr., as director of public relations. He also holds graduate degrees from North Carolina State College and Princeton University, is a former Charlotte newspaperman, and taught at Asheville School for Boys, N. C. State College, and Clemson College.

(*Continued on page* 130)

Chemstrand's Nylon Facilities—Florida

RECENT aerial view of THE CHEMSTRAND CORPORATION'S nylon filament yarn plant situated on a 2,000 acre tract 12 miles north of PENSACOLA, FLORIDA, shows plant office building and textile spinning area (center foreground) and chemical intermediates area (upper right). Upon completion it will become the first wholly integrated nylon plant in the United States and will have a total of 30 different structures.

It has an initial rated capacity of 50-million pounds per year and is expected to reach its maximum output in 1955. First shipments were made last December, and after successful testing, mills now are ordering the new Chemstrand nylon in commercial volume. When in full operation, approximately 3,000 persons will be employed.



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Here's a typical installation that is really paying off—a Continental Shuttle Conveyor handling 600 TPH at 350 FPM. Systems such as this are constantly proving the value and reliability of Continental Conveyor Equipment.

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CONTINENTAL GIN COMPANY

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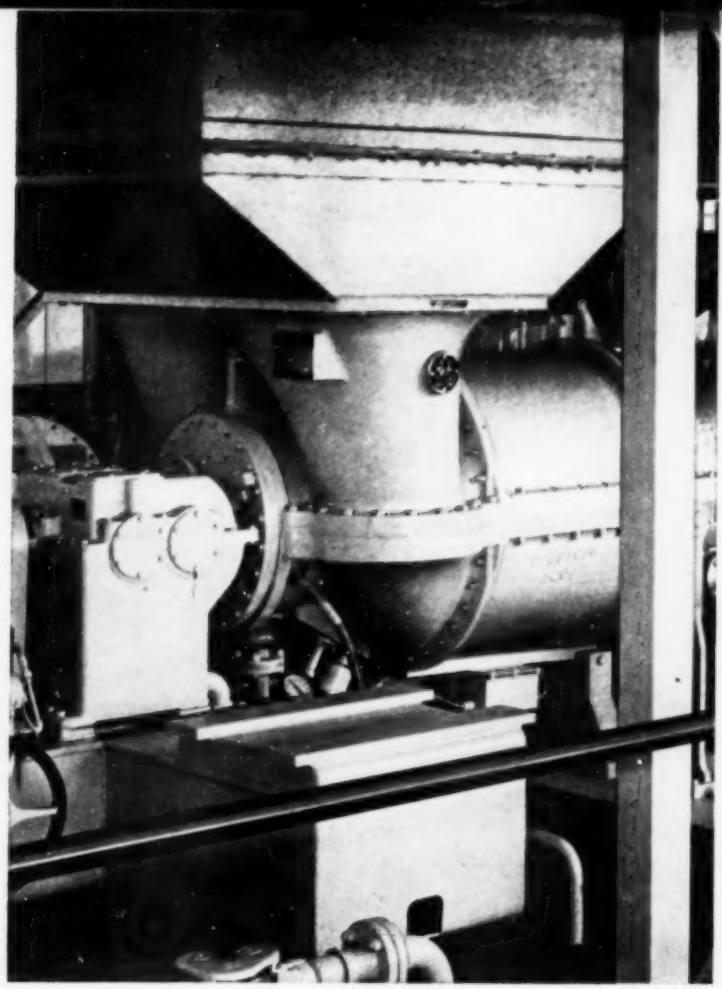
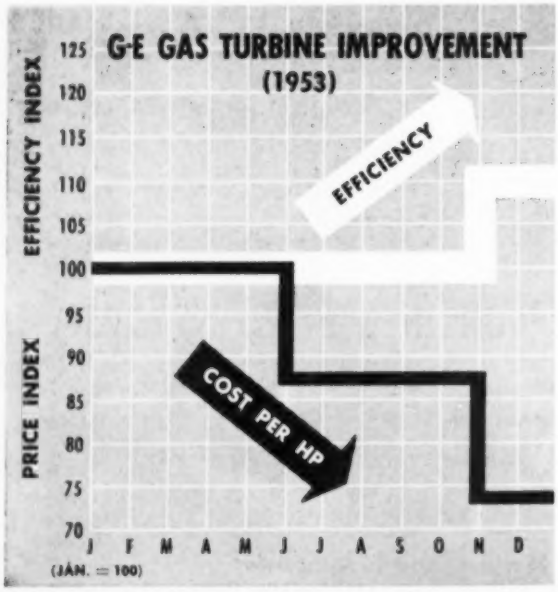
GAS TURBINE

progress report



In the past year, G-E engineers have reduced the cost per hp of the G-E gas turbine—and boosted its efficiency an average of 11 per cent. You may be able to put this versatile prime mover to work providing low-cost power for your plant.

Increased Efficiency, Versatility,



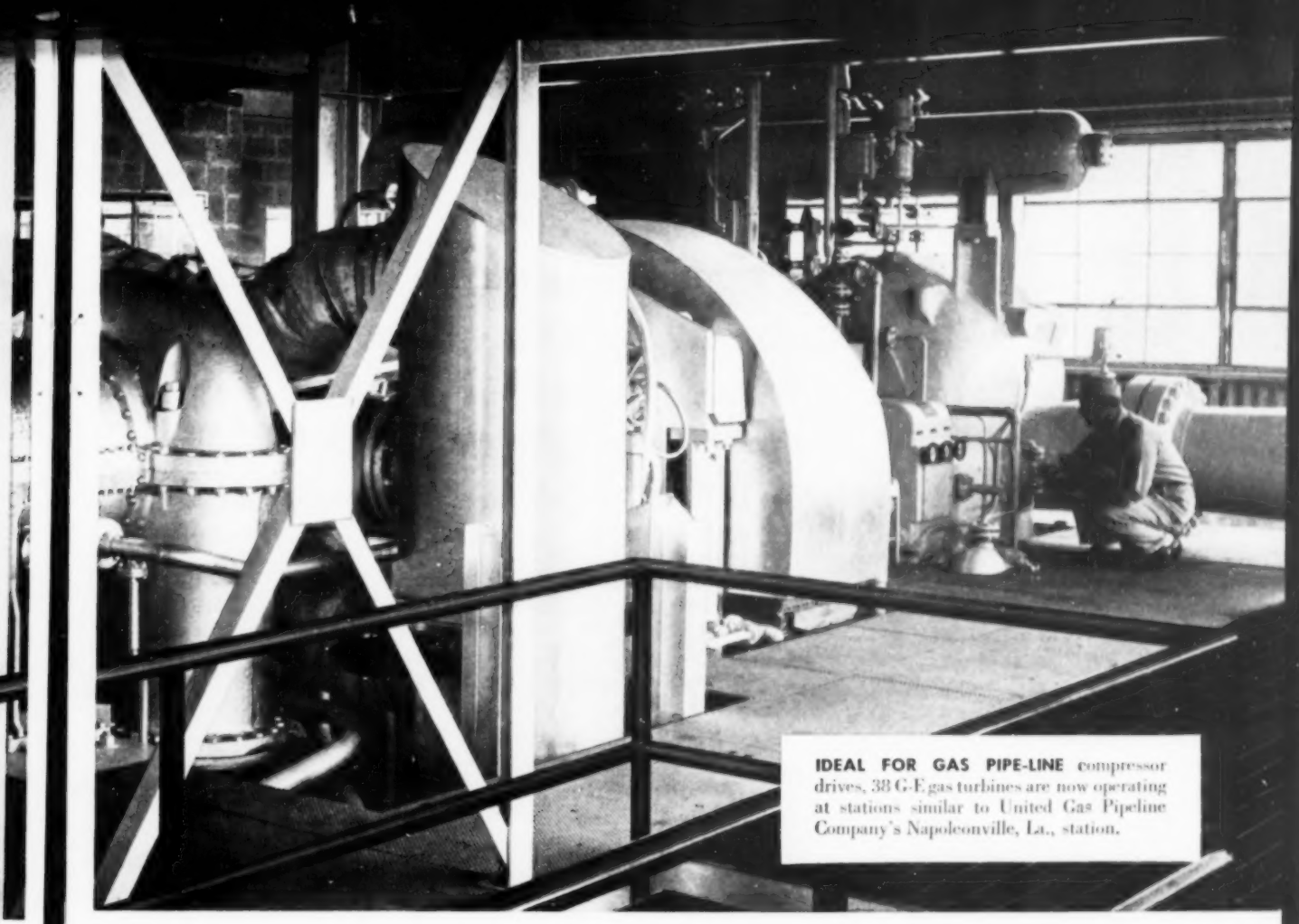
GREATER EFFICIENCY AND LOWER COST PER HP, achieved by improved design and manufacturing techniques, were significant G-E gas-turbine advances in 1953.

G-E GAS TURBINE OPERATING RECORD

(As of March 15, 1954)

TYPE OF SERVICE	NO. OF UNITS	OPERATING HOURS
LOCOMOTIVES	11	60,000
POWER GENERATION	16	70,000
GAS PIPE-LINE PUMPING	38	150,000
PETRO-CHEMICAL	1	3,000
TOTAL	66	283,000

UNEQUALED RECORD for operating hours and diversity of application, shows versatility and dependability of G-E gas turbine, gives G-E engineers vital data for future progress.



IDEAL FOR GAS PIPE-LINE compressor drives, 38 G-E gas turbines are now operating at stations similar to United Gas Pipeline Company's Napoleonville, La., station.

Lower Cost Per Horsepower Mark G-E Gas-turbine Progress

In less than five years, what was a completely new, un-tried prime mover has been shaped into a dependable, economical means of power. Already G-E gas turbines have racked up over 280,000 hours driving railroad locomotives, generating electric power, and turning high-speed compressors for gas pipe-line pumping and other industrial processes.

In the past year alone, G-E engineers have reduced the cost per horsepower for the gas turbines an average of 26 per cent. In the same short span, they have boosted efficiency an average of 11 per cent.

Outstanding among recent improvements is an integral base on which the turbine and its auxiliary equipment are permanently mounted and shipped substantially reducing installation costs.

How could all this happen? General Electric, leader in the design and manufacture of both steam turbines and jet engines, was well equipped to develop the combustion gas turbine. Now, with thousands of hours of operating experience already accumulated, and with a factory designed exclusively for their manufacture, G.E. is leading the way in the gas turbine field.

If you would like more information on the gas turbine, contact your nearest G-E Apparatus Sales Office or write to General Electric Company, Section 255-10, Schenectady 5, New York.

Progress is our most important product

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Now!...

An INTERRUPTING RATING in EXCESS of 100,000 AMPERES *for every set of fuse clips in your plant* . . . simply by installing FUSETRON *dual-element* FUSES

The Biggest Electrical Protection NEWS Since BUSS invented the FUSETRON Dual-Element FUSE

FUSETRON is a trademark of the Bussmann Mfg. Co., Division of McGraw Electric Co.

In 1947 tests made by the Electrical Testing Laboratories of New York, showed that on a circuit set to deliver 50,000 amperes, FUSETRON fuses in all tests cleared the circuit safely.

50,000 amp. Interrupting Capacity in 1947
becomes
100,000 amp. Interrupting Capacity Today

After years of intensive development work on FUSETRON fuses new tests were conducted under conditions that simulated the most severe field conditions and these tests were witnessed and verified by the Electrical Testing Laboratories of New York.

On circuits set to deliver in excess of 100,000 amperes, 30 to 600 ampere, 250 and 600 volt FUSETRON dual-element Fuses on each and every test cleared the circuit without belching flame or venting hot gases and with comparatively little noise.

Oscillograms of these tests interpreted by the Electrical Testing Laboratories, showed that the total available amperes including the direct current component, reached values as great as 165,000 peak amperes on 240 volt tests and as high as 212,000 peak amperes on the 535 volt tests.

This indicates that an interrupting rating of 100,000 amperes for FUSETRON dual-element fuses is a conservative one.

No interference with time-lag

In the development work to increase interrupting capacity in FUSETRON fuses it was kept in mind that the time-current characteristic must be maintained. Time-lag is of utmost importance to give proper motor and electrical protection and to eliminate needless blowing of fuses.

Remarkable results have been achieved. Interrupting capacity has been greatly increased while the time-current characteristic of FUSETRON fuses has in no way been disturbed.

Play Safe – install Fusetron Fuses throughout the entire electrical system!

Think!...

ALL THIS ADDED SAFETY *without changing a panelboard or switch... plus* 10 Point Protection of FUSETRON *dual-element* FUSES!

Maximum Safety

With FUSETRON Fuses there is no cascading of interrupting rating — no places where an excessive fault current might cause serious damage. Every FUSETRON fuse has an interrupting rating in excess of 100,000 amperes.

You don't have to worry about selecting chosen spots in which to *pay extra* for "safe" equipment. Wherever a FUSETRON fuse is installed you have safety as sure and dependable as you can buy — no matter what you pay.

No Maintenance Costs

When FUSETRON fuses have once been installed properly you can forget about them. They need no periodic inspections to see if they will operate safely.

Dust, fumes, corrosion or age cannot prevent a FUSETRON fuse from opening safely. There are no hinges, pivots or contacts to stick or slow down the operation of the fuse on short-circuit.

With FUSETRON fuses — you get safety — without one cent spent for inspection or maintenance costs.

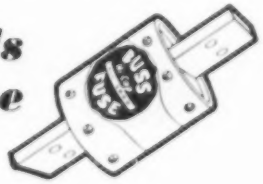
No Recalibration Costs

When a FUSETRON fuse does blow, there is no recalibration needed. As quickly as the fault in the circuit is corrected, you slip in a new fuse that has been CALIBRATED AT THE FACTORY BY ENGINEERS— a fuse that is as safe and dependable as the one that blew.

PLUS 10 POINT Protection with FUSETRON dual-element FUSES

1 Protect against short-circuits. **2** Protect against needless blows caused by harmless overloads. **3** Protect against needless blows caused by excessive heating — lesser resistance results in cooler operation. **4** Provide thermal protection — for panels and switches against damage from heating due to poor contact. **5** Protect motors against burnout from overloading. **6** Protect motors against burnout due to single phasing. **7** Give DOUBLE burnout protection to large motors — without extra cost. **8** Make protection of small motors simple and inexpensive. **9** Protect against waste of space and money — permit use of proper size switches and panels. **10** Protect coils, transformers and solenoids against burnout.

for SAFE PROTECTION on loads above 600 and up to 5000 Ampere install BUSS Hi-Cap FUSES



Tests have shown that BUSS Hi-Cap fuses have unlimited interrupting capacity on circuits of 600 volts or less.

They are designed to give protection against dangerous overloads as well as high fault currents — yet their speed of operation on heavy shorts limits currents to safe values. This minimizes damage to equipment and cuts down dangerous stresses on transformers.

When coordinated properly with FUSETRON dual-element fuses they will not open ahead of the fuses nearest to the fault. Thus trouble is isolated to the part of the circuit in which the fault occurs.

Added SAFETY on Old Installations

On installations where the increase in the capacity of the circuit has outgrown the interrupting rating of the circuit breakers, BUSS Hi-Cap fuses offer a safe and relatively inexpensive way to protect inadequate breakers against rupture in event of a bad fault.

ACTION THAT SAVES YOU MONEY

By passing the word along that all purchase and stock records should call for FUSETRON fuses on loads up to 600 amps—and BUSS Hi-Cap fuses on loads above that — you get action that begets money saving.

For blowing time charts or more information on FUSETRON Fuses and BUSS Hi-Cap Fuses write for Bulletins FIS and HCS.

Bussmann Mfg. Co., University at Jefferson, St. Louis 7, Mo. Division McGraw Electric Company

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443	451	466	491	493	508	509	527	564	575	576	610	611	619	627	653	654
708	716	732	758	766	770	814	820	825	833	835	854	871	875	906	907	956
957	959	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	R-10	R-11	R-12	R-13	R-14	R-15
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R-33																

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732 **SPRAY HEATERS**—Bulletin WC-161-A—Describes spray-type deaerating heaters, which use minimum steam—simple, noiseless operation and freedom from scaling and corrosion.—GRAVER WATER CONDITIONING CO.

758 **REFRIGERANT PURGERS** — Bulletin No. 221, 4 pages—Tells how purger removes air from ammonia, freon, other systems, to reduce head pressure, increase efficiency. Prices, physical data, diagrams included.—ARMSTRONG MACHINE WORKS.

766 **HIGH CAPACITY WATER SOFTENERS** — Bulletin 301 describes high capacity Belcolite softeners for lowest operating costs and increased efficiency. Includes chemical conversion tables and tables on tank capacity, with information regarding Belco automatic controls.—BELCO INDUSTRIAL EQUIPMENT DIVISION.

770 **AUTOMATIC MULTIPORT VALVE** —Bulletin 2447A — Illustrates the passage of water through a multiport valve by means of several schematic drawings showing raw water entering, regenerating backwash, rinsing, etc.—THE PERMUTIT CO.

ELECTRICAL

814 **ELECTRICAL PANELBOARDS** — Booklet F-1, 37 pages — Depicts plant and equipment for producing breechings, casings, panelboards and other items of steel fabrication up to ¼" thickness. Profusely illustrated with representative photographs of products—THE KIRK & BLUM MANUFACTURING COMPANY.

820 **MOTOR CONTROL UNITS**—Bulletin 800-T—Describes oil tight solenoid motor controlled units for machine tools and similar equipment with various accessory equipment to fit the particular job.—ALLEN-BRADLEY CO.

825 **POWER CAPACITORS** — Manual 50-B—Describes power factor improvements and the problems involved, with helpful data and information on the use of Sprague capacitors for on-the-spot power factor correction at minimum cost. New impregnant permits units 33% smaller.—SPRAGUE ELECTRIC CO.

833 **BRONZE BEARINGS FOR MOTORS**—Catalog 152—Gives complete specifications of stock bronze bearings particularly intended for application to electric motors. — THE BUNTING BRASS & BRONZE CO.

835 **POWER FACTOR CAPACITORS**—Catalog 50B — Describes unit-cell capacitors for on-the-spot power factor correction of electrical apparatus. Capacitors shown are particularly well suited for industrial plants, to relieve overloading of electrical power distribution systems. Typical applications shown.—SPRAGUE ELECTRIC CO.

854 **ADEQUATE WIRING** — Booklet "Wire Ahead"—Discusses preventive maintenance in electrical systems—the symptoms of inadequate wiring—and plans for anticipating electrical demands.—ANACONDA WIRE & CABLE COMPANY.

871 **ELECTRICAL PROTECTION**—Protection Handbook — Tells how to protect motors, apparatus and circuits. Gives National Electrical Code requirements in simplified form. Designed to help the electrical or plant maintenance engineer.—BUSSMANN MFG. CO.

875 **COAL MINING WIRE AND CABLE** —Catalog W-51-7—Gives a comprehensive, highly informative booklet describing electrical wires and cables used by the coal mining industry. Includes insulation and jacket compounds, portable cords and cables, and miscellaneous mine equipment. —UNITED STATES RUBBER COMPANY.

MISCELLANEOUS . . . SAFETY, BUILDING EQUIPMENT, METALS

906 **INDUSTRIAL DUST COLLECTOR** —Catalog 101 — Describes the Aerotec industrial dust collector, available in self-contained, custom-built industrial assemblies which may be adapted as integral parts of existing equipment, with tube performance records given on eight representative dusts.—THERMIX ENGINEERING CO.

907 **SHEET METAL PANELS, CUBICLES, ETC.**—Descriptive Booklet — "Contract Manufacturing in Sheet Metals" describes job-tailored control centers, bus enclosures, cubicles, switchgear housings, panel and various other sheet metal assemblies for utility and industrial plant applications.—THE KIRK & BLUM MFG. CO.

958 **SWIMMING POOL EQUIPMENT**—Bulletin WC-109—Describes a complete line of swimming pool equipment, including filters, chemical feeders, sterilizers, hair and lint catchers, pool cleaners, recirculating pumps, heaters, fittings and accessories—dimension, capacity and other tables.—GRAVER WATER CONDITIONING COMPANY.

957 **ROTARY DUMPERS FOR MINE AND RAILROAD CARS**—Booklet 2045-A — Describes and illustrates rotary railroad car dumpers, capable of unloading open-type railroad cars at the rate of 1½ min to a full cycle of dumping and return.—LINK-BELT CO.

959 **THERMAL INSULATION** — Chart IN-6D, 11½ in. x 15 in., suitable for hanging on the wall, shows at a glance the recommended insulation for every temperature range, from minus 400 F to plus 3000 F. —JOHNS-MANVILLE CORP.

Continued on page 138

6-54-3

Please send me without obligation, free booklets described in the June, 1954, issue of SOUTHERN POWER AND INDUSTRY as circled below.

8	11	15	25	34	38	49	55	60	61	69	73	75	82	86	103	106
107	114	132	136	140	166	234	238	242	299	304	309	311	325	343	390	394
443	451	466	491	493	508	509	527	564	575	576	610	611	619	627	653	654
708	716	732	758	766	770	814	820	825	833	835	854	871	875	906	907	956
957	959	R-1	R-2	R-3	R-4	R-5	R-6	R-7	R-8	R-9	R-10	R-11	R-12	R-13	R-14	R-15
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R-33																

Also send further information on following New Equipment (page 118)

F-1 F-2 F-3 F-4 F-5 F-6 F-7 F-8 F-9 F-10 F-11 F-12 F-13 F-14 F-15 F-16 F-17 F-18 F-19 F-20

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SOUTHERN POWER AND INDUSTRY
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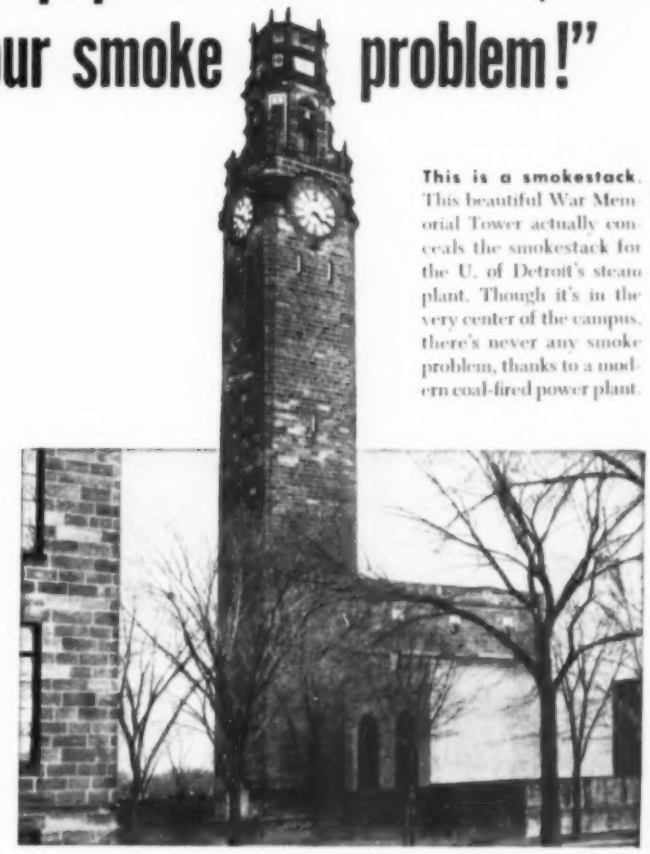
List Items You Want, Tear Out and Mail One of the Attached Cards Now!

Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.

"How modern coal equipment saves us $9,000 a year and solves our smoke problem!"

Says Albert E. Unruh,
Chief Engineer
University of Detroit
Detroit, Michigan



This is a smokestack. This beautiful War Memorial Tower actually conceals the smokestack for the U. of Detroit's steam plant. Though it's in the very center of the campus, there's never any smoke problem, thanks to a modern coal-fired power plant.

"Again and again over the last decade, coal burned with modern equipment has proved itself the most flexible, economical fuel for heating our school buildings. We made our first investment in modern coal equipment shortly after the last war. By 'restokering' two existing boilers, we saved $9,000 the first year—actually $2,500 more than we estimated. At the same time, we solved a disturbing smoke and flyash problem and provided enough steam capacity to heat additional new buildings.

"We're completely sold on coal. And when our building expansion program required us to further increase steam production, we again chose a modern coal-fired boiler. Coal has proved its ability to handle increased loads and save us dollars year after year. And modern equipment eliminates smoke nuisance."

Additional case histories, showing how other types of plants have saved money by burning coal with modern equipment, are available upon request.

If you operate a steam plant, you can't afford to ignore these facts!

BITUMINOUS COAL in most places is today's lowest-cost fuel, and coal reserves in America are adequate for *hundreds of years to come.*

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

COAL prices will therefore remain the most stable of all fuels.

COAL is the safest fuel to store and use.

COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

If you want to cut steam costs, it will pay you to investigate the advantages of modern coal equipment. For example, you may be able to save as much as 20% on fuel alone by replacing outdated equipment with modern stokers and boilers. Or, a small investment in modern controls and other up-to-date, fuel-conserving devices may boost efficiency of your present operation.

You can save on labor, too, by installing modern handling equipment. Modern coal-feeding and ash-removal systems can eliminate practically all hand labor.

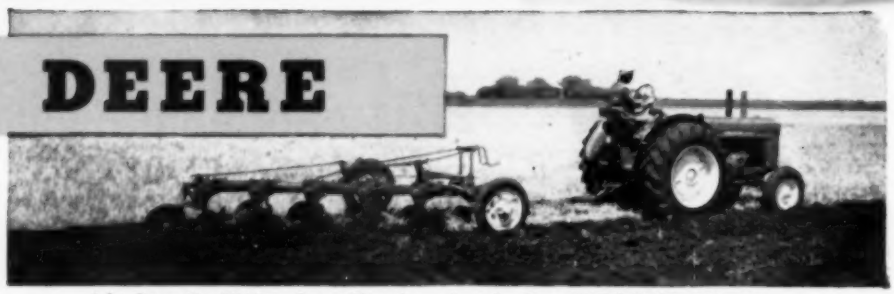
Call in a consulting engineer. He can give advice on what equipment best fills your specific needs. And his recommendations may save you dollars year after year.

BITUMINOUS COAL INSTITUTE
A Department of National Coal Association
Southern Building, Washington 5, D. C.

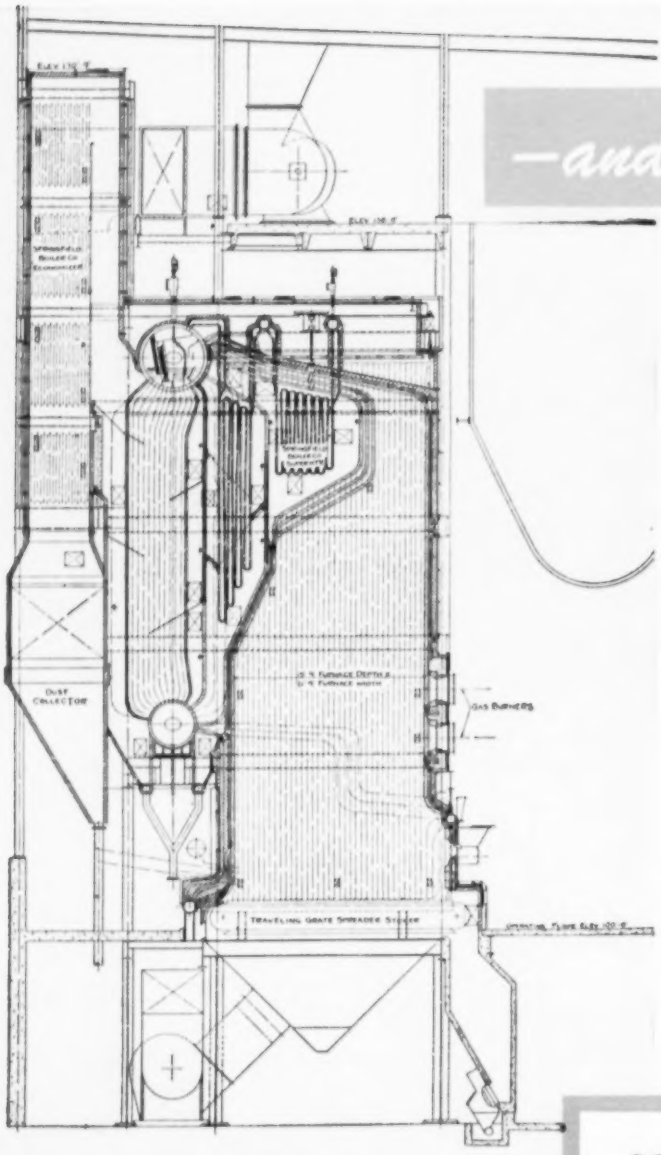
FOR HIGH EFFICIENCY FOR LOW COST

YOU CAN COUNT ON COAL!

JOHN DEERE



John Deere No. 77 Truss Frame Plow drawn by John Deere Model "R" Diesel Tractor



—and SPRINGFIELD

28 Boilers in 28 Years

"We have purchased twenty-eight boilers from Springfield Boiler Co. during the past twenty-eight years. The first boiler, as I recall, was for the John Deere Malleable Works in East Moline," writes S. A. Nelson, Supervisor of Plant Engineering for Deere & Company, Moline, Illinois. With manufacturing plants located across the country, Mr. Nelson has had opportunity to study boiler operation and efficiency under widely varying conditions. The latest *repeat order* for a Springfield-built unit is a 185,000 lb. high pressure steam generator (*left*) recently placed in service at one of the company's large midwestern factories.

Handling *repeat orders* is an important part of Springfield's business. It comes from the *plus values* Springfield gives in (1) ENGINEERING DESIGN, (2) SHOP FABRICATION, and (3) FIELD ERECTION—values that result in superior performance, less maintenance, greater lifetime economy.

Find out about the broad range of service SPRINGFIELD offers—from small, standardized PACKAGE BOILERS to large, specially designed STEAM GENERATING UNITS. *Your inquiry will receive prompt attention.*

NEW INSTALLATION
at a midwestern John Deere plant

Continuous Steam Capacity	185,000 lb./hr.
Maximum Steam Capacity, 2-hr. peak	204,000 lb./hr.
Boiler Design Pressure	925 psig
Operating Pressure, at Superheater Outlet	850 psig
Final Steam Temperature	835°F.
Feedwater Temperature	230°F.
Type of Firing	Spreader Stoker (future gas)
Furnace Width	21'-9"
Furnace Depth	15'-9"

Worldwide Sales and Service

SPRINGFIELD BOILER CO.

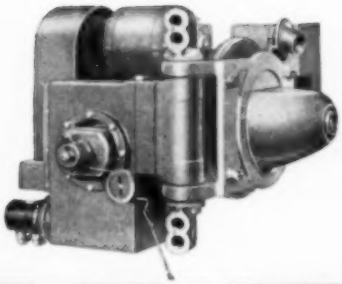
FOUNDED IN 1890

DIVISION OF *John W. Hobbs Corporation*

1957 E. Capitol Avenue • Springfield, Illinois

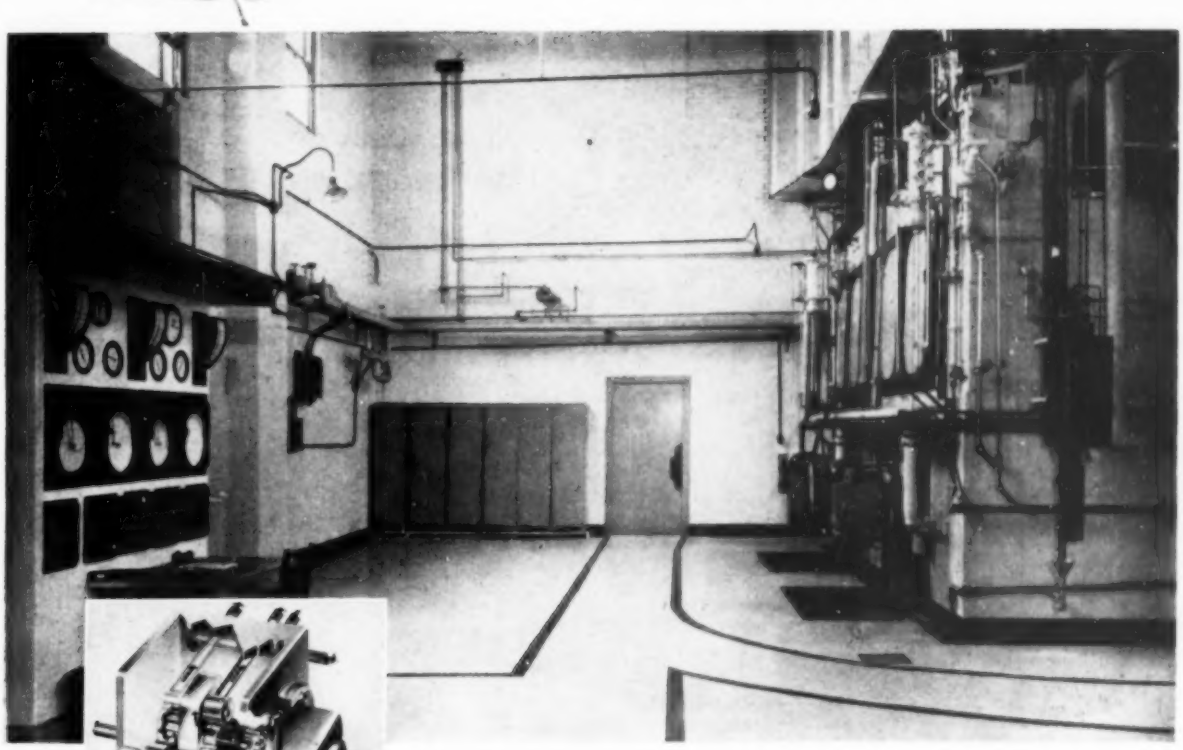
See our catalog in SWEET'S

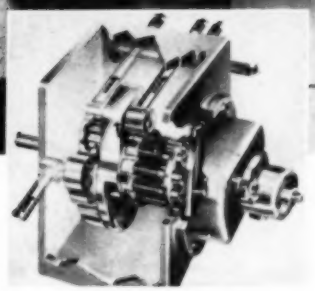
Check with your Consulting Engineer on Modernization and New Plant Projects



Saving: $3500 a year

with Iron Fireman Rotary Oil Burners firing No. 6 oil





Fires any weight of oil without special adjustment

The Iron Fireman Oil Volumeter is a variable volume metering pump submerged in the oil reservoir. Oil feed rate is controlled with extreme accuracy (within ½ of 1% of setting) regardless of changes in oil viscosity. Oil is measured by volume, not by valves or ports.

St. Therese's Hospital, Waukegan, Illinois reports on Iron Fireman heavy oil burners after 4 years use.

This fine boiler room is 100% automatic. Full modulating fire control provides the exact volume of steam required to meet the varied demands of a fluctuating load. No slow pick-up or wasteful over-firing. Sluggish heavy oils (No. 6) are regulated with extreme accuracy by the Iron Fireman Oil Volumeter (see picture at left).

Actual cash savings of $3500 have been reported by Mr. George Juppe, Chief Engineer. About $500 of this sum is attributed to savings in maintenance costs—an indication of Iron Fireman dependability.

"Our burners have proved very reliable over a wide range of operation," says Mr. Juppe. "Their high efficiency is not affected by variance in the quality and temperature of the fuel oil."

Send this coupon for more information, or see your Iron Fireman dealer.

Iron Fireman

AUTOMATIC FIRING FOR OIL, GAS, COAL

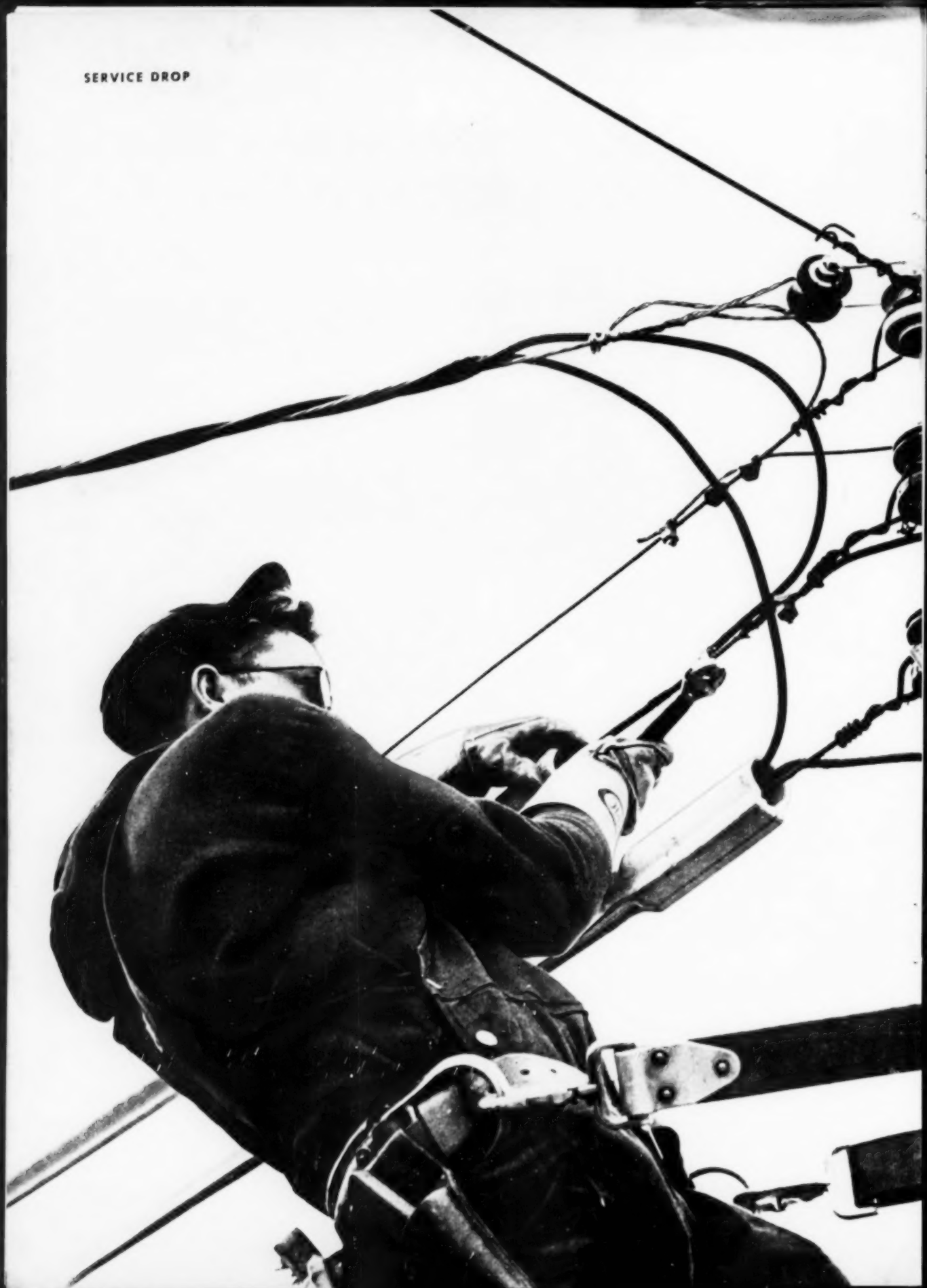
Iron Fireman Manufacturing Co.
3051W. 106th St., Cleveland 11, Ohio
In Canada: 80 Ward St., Toronto, Ontario

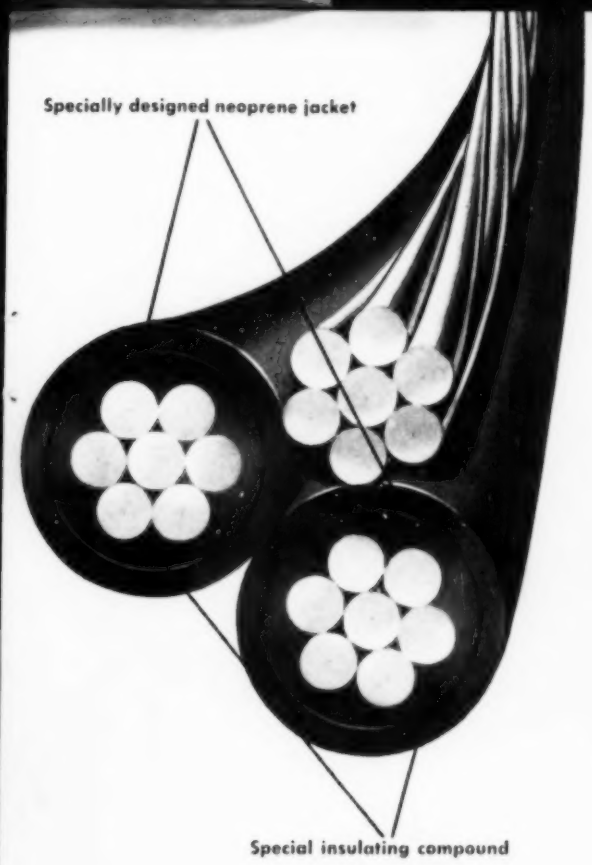
Please send detailed information on the Iron Fireman line of industrial burners for oil, gas, or oil-gas combination, including package burner units with forced or natural draft.

Name

Address

City State


SERVICE DROP



DOUBLE PROTECTION is important feature of Anaconda 2 + 2 Type N-SD service drop. Note inner and outer layers.

CABLE ENDS of Anaconda 2 + 2 Type N-SD are quickly and easily made ready for service connection.

Unique construction gives Anaconda 2+2 Type N-SD Cable double protection

NOW Anaconda offers a new Type N-SD service-drop cable — called 2 + 2. *Each* of its two conductors is covered with not one—but *two* durable, protective layers.

One layer is a fine insulating compound. The other is a tough jacketing material.

The compound for the inner layer has built-in electrical qualities—designed for heat and moisture resistance.

The outer layer is in fact a specially designed neoprene jacket—best for wear and weather resistance.

Together these two layers give *double* protection. That means longer life . . . greater service reliability.

See this cable for yourself. The Anaconda Representative nearest you will be glad to show you samples...and to answer your questions. Call him today. Or for more information, write *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

ANACONDA

Power cables of all description • service and overhead distribution cable, bare and weatherproof, including ACSR • signal, control and communication wire • portable cords and cables • network cable • magnet wire • copper, aluminum and copperweld conductors • wire and cable accessories.

LINEMAN ON POLE handles ANACONDA 2 + 2 Type N-SD Cable easily. Minimum effort speeds the lineman's work.

Meet the man you can call with confidence to solve your thermal insulation problems

To insulate outdoor tanks with complete weather protection, these skilled J-M applicators follow a specification developed by Johns-Manville. Here they are fastening J-M Asbestocite* Sheets over J-M Zerolite* Insulation. J-M 85% Magnesia Insulation is also widely used for this type of equipment

He is your J-M Insulation Contractor... the man with the world's most complete insulation engineering service

"Insulation is no better than the man who applies it." Today, with rising fuel and maintenance costs, it is especially important to place your insulation job in skilled hands. The scientific application of J-M quality insulations by J-M Insulation Contractors will assure you of the maximum return on your insulation investment for years to come. Moreover, you get undivided responsibility for *all* your insulation requirements.

1. You get dependable materials—Johns-Manville manufactures a complete line of insulations for every service temperature from minus 400F to plus 3000F. From them your J-M Insulation Contractor can select the right insulation for the most dependable service on your job. To develop new and improved insulation materials Johns-Manville maintains the J-M Research Center—largest laboratory of its kind in the world.

2. You get dependable engineering—For 95 years Johns-Manville has been accumulating insulation engineering experience. J-M Insulation Engineers are called upon to solve insulation problems of every type and magnitude, in every industry. Since your J-M Insulation Contractor works closely with J-M Insulation Engineers, he brings to *every* job a high degree of training, skill and experience.

3. You get dependable application—Johns-Manville has set up a nationwide organization of J-M Insulation Contractors to serve you. These Contractors maintain staffs of insulation engineers as well as skilled mechanics thoroughly trained in J-M's proved application methods. You can have absolute confidence in their ability to apply J-M insulations correctly for trouble-free performance.

For further information and the name of your J-M Insulation Contractor, write Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay St., Toronto 1, Ont.

*Reg. U. S. Pat. Off.

Johns-Manville *FIRST IN* INSULATION

MATERIALS · ENGINEERING · APPLICATION

Florida Power & Light mobile generating plant equipped with Wagner Power Transformers.

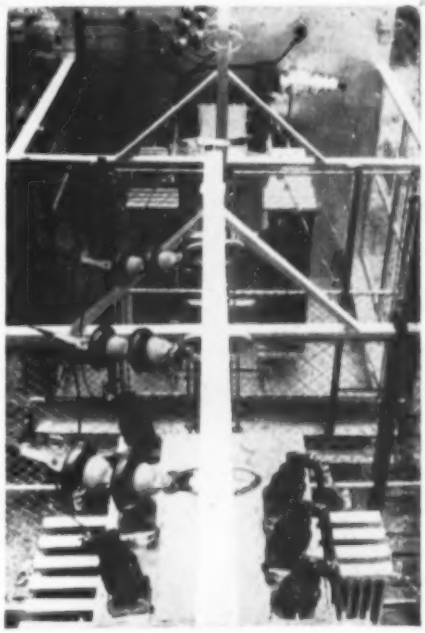
clear the track for Sunshine Service

Power's on the move in fast-growing Florida, as evidenced by this unique, modern generating-plant-on-wheels operated by Florida Power & Light Company.

Mounted on a special 74-foot former circus train flat car, it is one of two such plants designed by FP&L engineers to supply quick emergency or auxiliary electric power wherever required in the Company's state-wide system. It has served both storm-damaged areas and thriving new resort communities like Naples, Florida, where seasonal tourist influxes call for sharply increased electric service.

The self-contained plant is designed for continuous operation if necessary and connects with all FP&L power supply facilities. It is equipped with a 1000-horsepower Diesel engine, a 700-kilowatt generator, and Wagner variable-voltage Power Transformers, delivering voltages from 2,300 to 13,200 volts.

Here is further proof that meeting unusual electric requirements comes easily with Wagner. Whatever the problem, Wagner has the *right* answer. Let a skilled Wagner engineer discuss your needs with you. Contact the nearest of our 32 branch offices, or write us direct.



Wagner Electric Corporation EST. 1891

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6383 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

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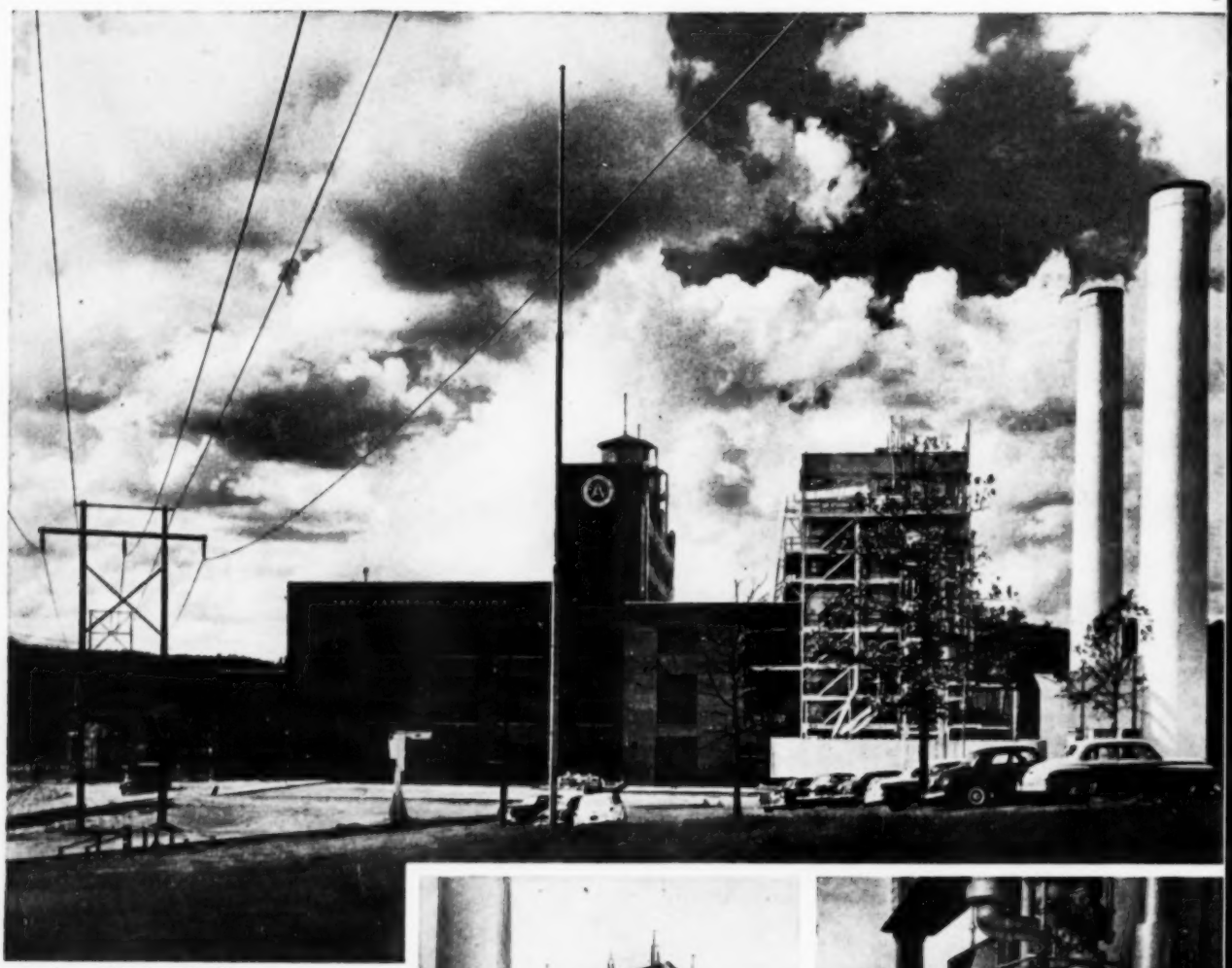
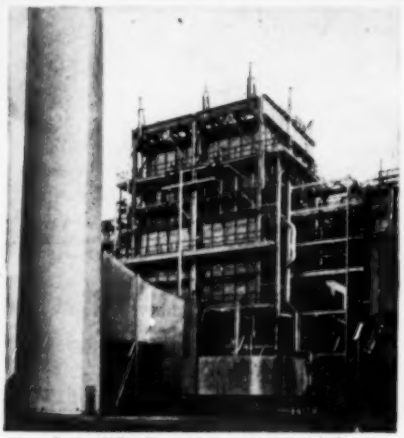
FOUR MORE OUTDOOR S

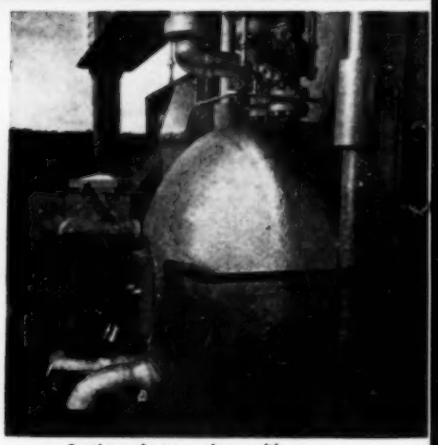


Lake Catherine Station of the Arkansas Power and Light Company.

All Units
Engineered By:
EBASCO SERVICES INC.



Foster Wheeler steam generator of the outdoor-type installed at the Arkansas Power and Light Company. Typical of those installed at Louisiana Power and Light Company, and Mississippi Power and Light Company.



Section of steam drum with external weatherproof covering protruding through water-tight, air-tight steam generator casing.

STEAM GENERATORS!

Foster Wheeler outdoor-type steam generators, each of 900,000 lb per hr capacity, now serving

Lake Catherine Station.....1 unit
ARKANSAS POWER AND LIGHT COMPANY

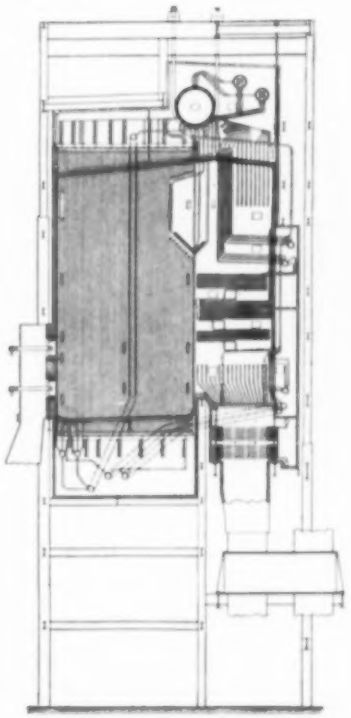
Ninemile Point Steam Electric Generating Station.....1 unit
LOUISIANA POWER & LIGHT COMPANY

Delta Steam Electric Station.....2 units
MISSISSIPPI POWER AND LIGHT COMPANY

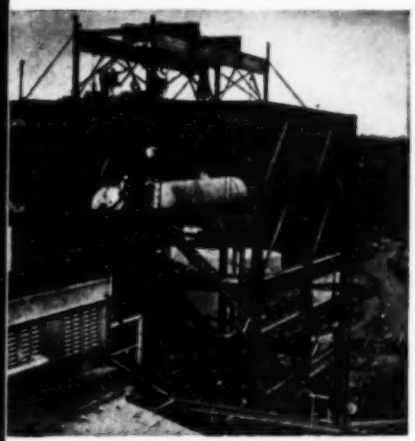
Reflecting the wide acceptance of the outdoor-type steam generator, these four Foster Wheeler units are all serving power plants in the South. Because of the traditionally mild climate in these areas, the minimum of weather protection is required for personnel, steam generating units and auxiliaries. This same basic design has proved practical and economical in the Northern States, the only difference being in the extent of weather protection provided.

Each of these new steam generators has a capacity of 900,000 lb per hr continuously, and 950,000 lb per hr for an eight hour peak. Each delivers steam at 1550 psi and 1005F at the superheater outlet. A superheat control condenser maintains steam temperature constant over an operating range from 600,000 lb to 950,000 lb per hr.

Because of the proven economy and suitability of outdoor-type construction under a wide variety of climates, Foster Wheeler units, such as these, bring a new abundance of low-cost power to help promote the industrial growth of the regions they serve.



Cross-sectional elevation of the Foster Wheeler 900,000 lb per hr outdoor-type steam generator. Arrangement provides for modification of furnace for future pulverized coal firing.



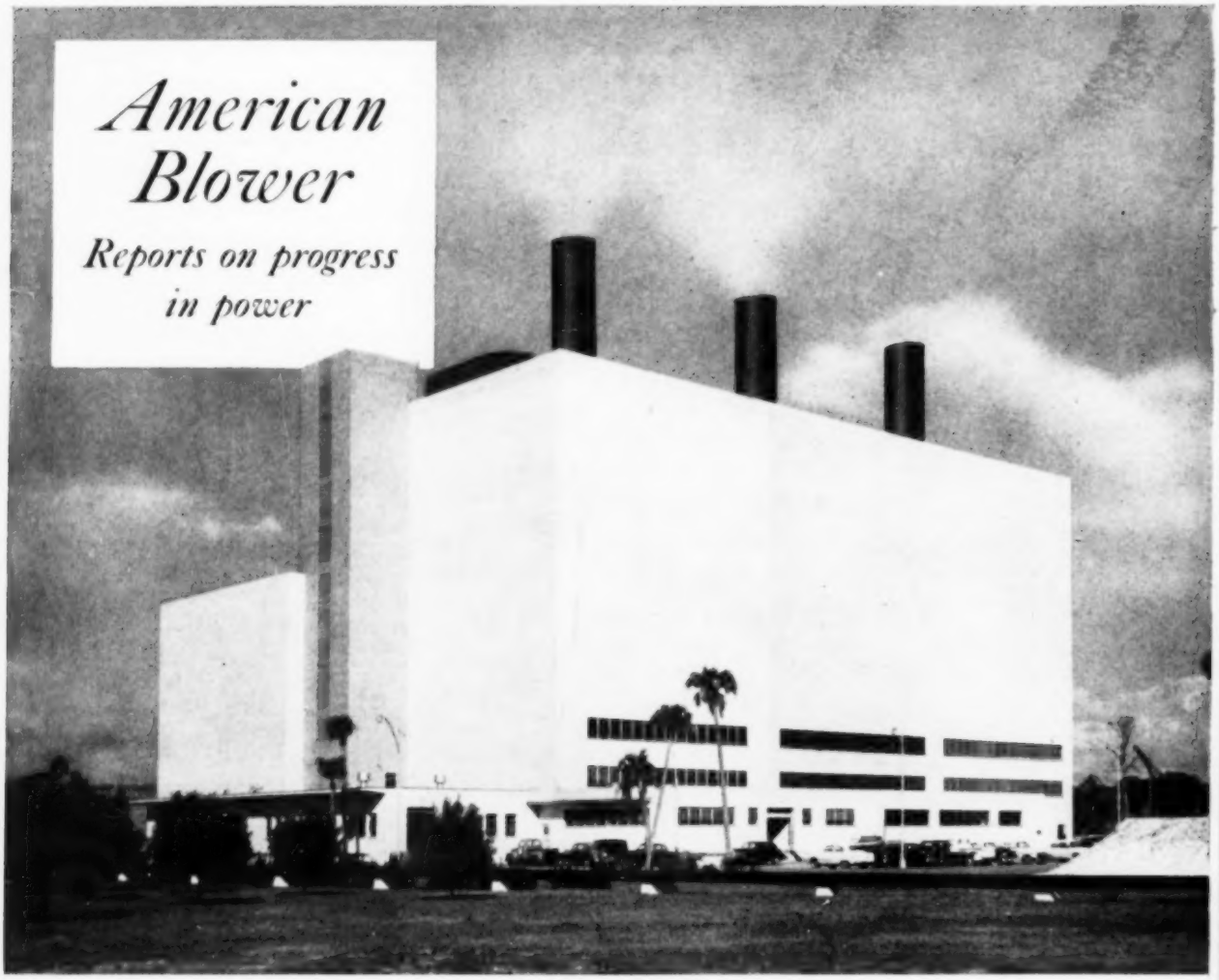
The 145 ton drum of the Foster Wheeler outdoor-type steam generator being placed in position on structural steel framework at Lake Catherine Station.

FOSTER WHEELER

FOSTER WHEELER CORPORATION
165 Broadway, New York 6, N. Y.

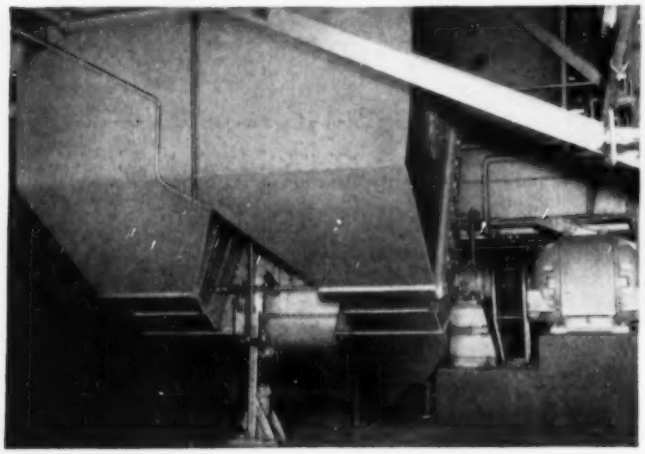
American Blower

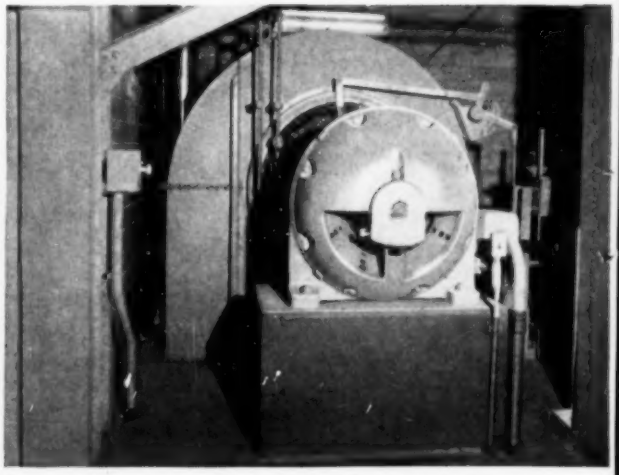
Reports on progress in power



Completed in 1954, the Higgins Plant at Oldsmar, Florida has a capability of 135,000 kw. Each of its three steam generating units requires 550,000 barrels of fuel oil annually.

Florida Power showed a remarkable increase (279%) in electric sales revenues from 1942 through 1952. Continued expansion is anticipated to meet the growing demand. Shown below is one of the new American Blower Induced Draft Fans on #1 boiler at the beautiful new Higgins Plant.



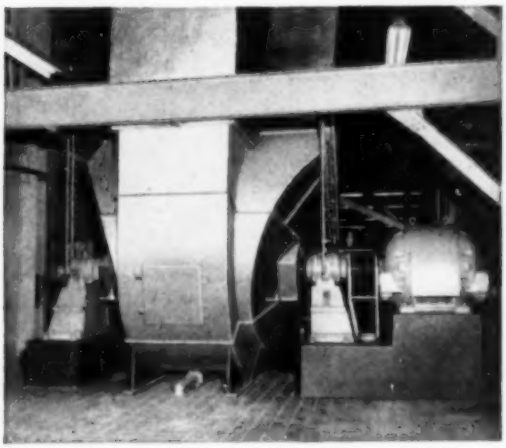


Also on Higgins #1 boiler is this American Blower Forced Draft Fan, rated at 81,400 cfm, 695 rpm, and 10.5" sp. Florida Power helps make the communities it serves good places to live and work.

Serving home and industry: **AMERICAN STANDARD** •

Florida Power Corporation keeps pace with rising needs for electricity

In 1897, the first plant of what is now the Florida Power Corporation went into operation with a wood-burning boiler and a 50 kw generator. Today, Florida Power and its subsidiary, Georgia Power and Light Company, serve 31 counties in Florida and 21 counties in Georgia. Total capacity is now 408,300 kw!



Here's another American Blower Sirocco Induced Draft Fan at the Higgins Plant. It is rated at 145,400 cfm, 695 rpm and 10.9" sp. Throughout the power plant industry, American Blower's experience and know-how are helping plant operators solve their power plant problems.

Naturally, this continued expansion has been based on the growing needs of the area for low-cost electricity for homes, business and industry. Future needs are anticipated and planned for . . . years ahead of time.

Like other investor-owned utilities, Florida Power keeps output high and costs low by selecting dependable, efficient equipment — including American Blower Forced and Induced Draft Fans.

Power plant operators everywhere are specifying American Blower Mechanical Draft Fans, Dust Collecting Equipment, Fly Ash Precipitators and Gyrol Fluid Drive for boiler feed pump and fan control. They know they can depend on American Blower Equipment and American Blower technical assistance.

If you have an air handling problem, or are planning to expand or modernize, find out how American Blower can help you. Contact your nearest American Blower Branch Office, or write us direct.

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CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
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AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

3¢ just saved me 900 dollars

THAT's what I said—3 cents. The cost of a postage stamp — the stamp I used to mail an inquiry to National Tube.

You see, we just put an addition on the plant. It was my job to specify the pipe and tubing. I had decided to buy NATIONAL Seamless because we'd already used it with great success for boiler-feed lines as well as main steam piping.

However, the higher temperatures and pressures we planned to use made me a little apprehensive as to the analysis I should select. After a good deal of thought, I chose a high alloy steel in a heavy-weight seamless grade. I prefer to keep on the heavy side of weight tolerances rather than on the light side. It's safer.

Before I turned in my recommendation for the analysis, though, I decided to ask National Tube about it—just to be sure. That's when I stuck that lucky 3-cent stamp on the envelope and sent it to National's district office.

A National engineer came out, looked the plant over, did a little figuring, and handed me the *correct* analysis.

The pipe and tubes I had specified were good—but just a little *too* good for the job. When the costs were figured, the material recommended by National Tube was 900 dollars *less* than the type I had selected. And the advice hadn't cost me a cent.

Let me tell you—National Tube helps make sure you get the *right* pipe or tube for the job, everytime. And at the least cost to you. So why take chances?

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
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U·S·S NATIONAL *Seamless* PIPE AND TUBES

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send us a sample

Whatever is wrong with your natural water supply . . . for boiler feed, for process, for almost any purpose . . . there's an answer to the problem.

The Graver Water Conditioning Co. is in the business of solving water treating problems . . . with research, laboratory and pilot plant testing, equipment design, fabrication, erection services, whatever it takes to give you the water you need.

Companies like Esso, Dow, U. S. Steel, Philadelphia Electric, and Procter & Gamble are Graver customers. They wouldn't be if we didn't know our business.

No matter what process or product is required . . . hot process-hot zeolite softeners, Reactivators®, filters, deaerators, demineralizers, ion exchangers, clarifiers, or what have you . . . Graver equipment, backed by 40 years of experience, can help. We will do the whole job or any part of it, from problem through planning to erection.

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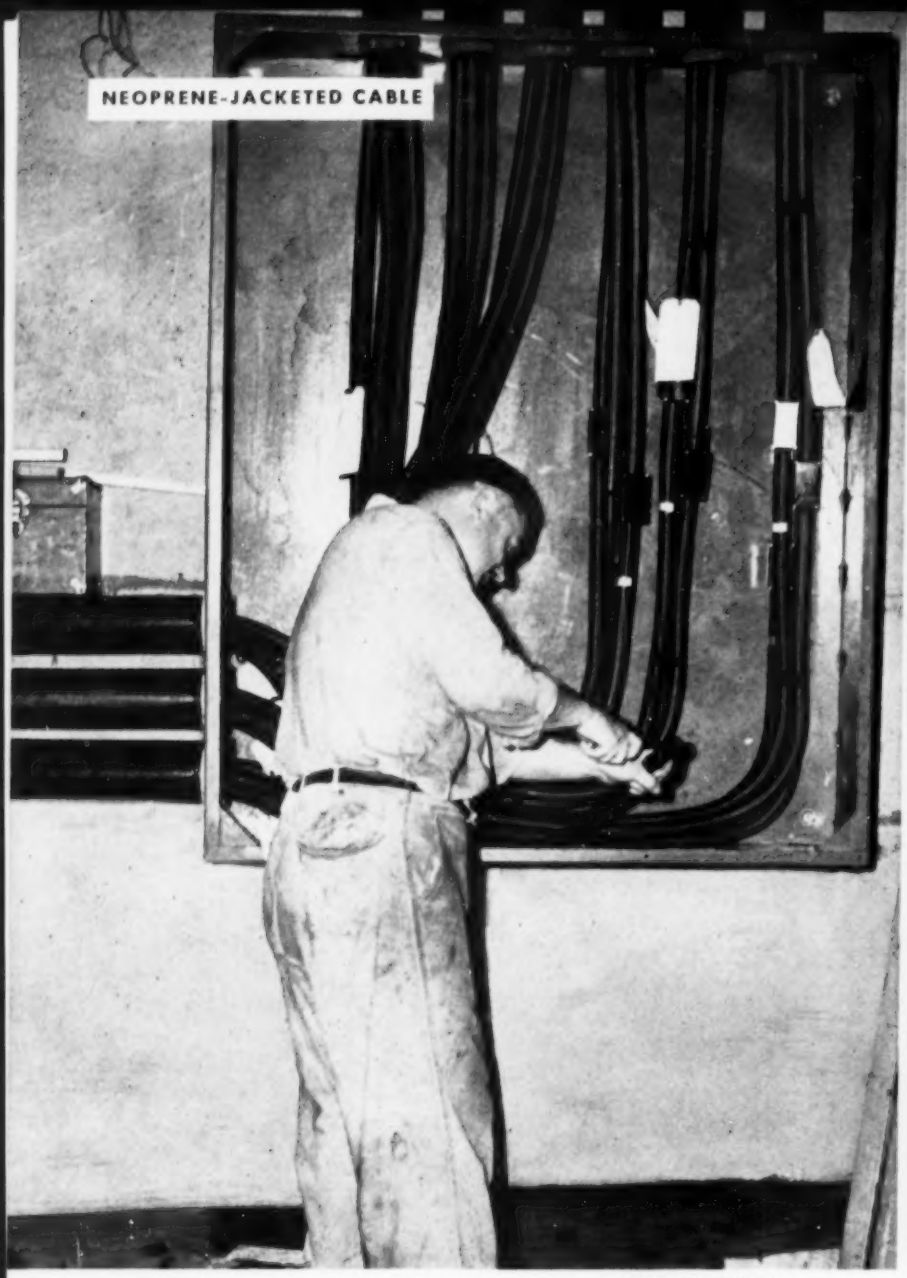
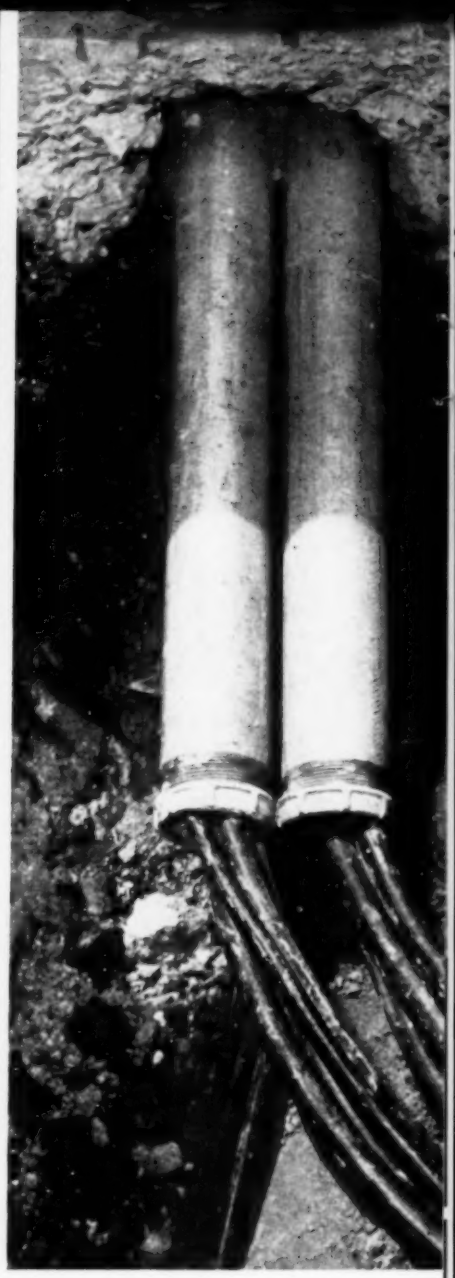




. . . FOR PLANTS

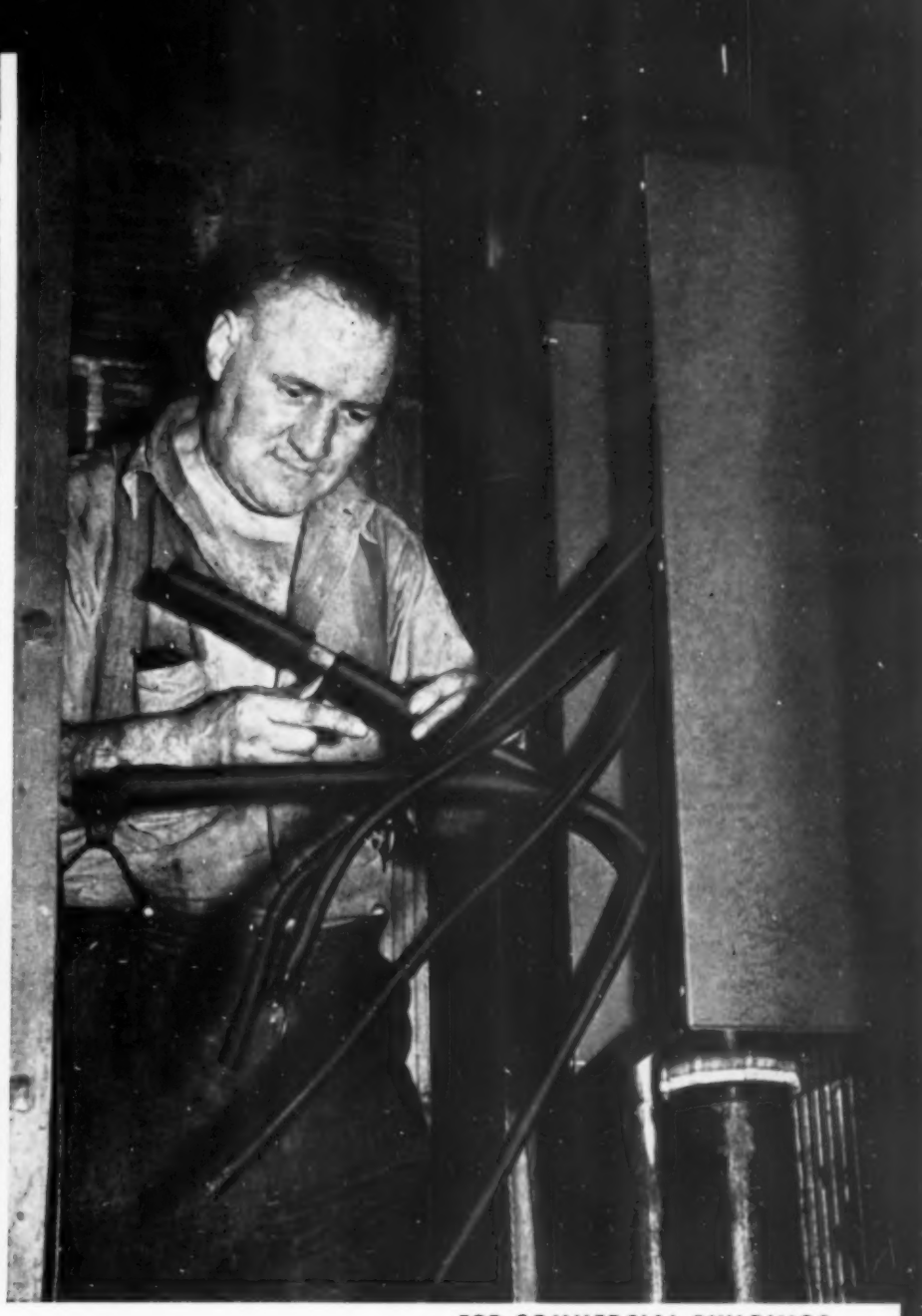
How to get premium wiring for little more

The cable to use is DURASHEATH.
Its actual over-all cost is so little more than the cheapest cable

Wait! Before you buy cable on price alone, see how *little* a premium wiring job actually costs. And what good insurance it is!

When you're wiring up, for power or lighting, the price of wire and cable is but a *fraction* of the over-all cost. Simple arithmetic follows – *it makes very little difference in the total cost of the job* whether you buy

. . . FOR UTILITIES



. . . FOR COMMERCIAL BUILDINGS

than you now pay

the cheapest cable or a premium cable like neoprene-jacketed Durasheath*.

But what a difference there can be in performance!

Anaconda's Durasheath is tough . . . heat-resistant . . . long-lasting. Its rugged neoprene jacket resists moisture, chemicals, sunlight, corrosion, electrolysis, abrasion and mechanical injury. It delivers real service dependability year after year.

And Durasheath is good for almost any job you have. You can bury it directly in the ground . . . run it in damp ducts . . . string it overhead . . . in *one continuous run* with minimum splicing. Order through your Anaconda Sales Office or distributor. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

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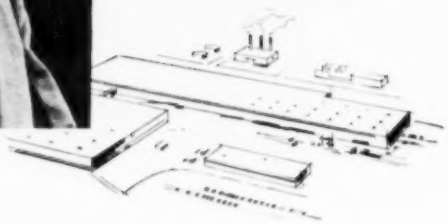


My name is Dave Lawton. I'm manager of the plant you see on the next page. It's General Electric's new Medium Transformer Plant at Rome, Georgia. In the heart of the South, we're dedicated to serving the growing electrical needs of this area — and of the entire nation.

You are cordially invited to drop in and visit us at any time. The next 6 pages will give you a few glimpses of what you will see here at Rome. 422-14

D. B. Lawton

GENERAL ELECTRIC

General Electric opens $25 million Rome, Ga., plant to build you better power transformers . . . faster

There's a brand new kind of plant today in the heart of the booming South. It's General Electric's giant Medium Transformer Plant just completed at Rome, Georgia . . . to mass-produce power transformers designed in accordance with ASA Standards.

The cost-conscious electric utility industry's acceptance of the RM (Repetitive Manufacture) idea accented the need for this new plant. In six years, shipments of standardized units by General Electric have jumped 59 percent. What's more, this trend is growing even stronger—utility after utility is expressing preference for RM-ASA transformers because their price is less, by up to 8%, and they can be delivered months sooner.

Bigger and better manufacturing facilities were needed to meet this swing. The new General Electric plant at Rome, Georgia, is the result. It has been planned, designed, and built with one purpose: to make the finest transformers in the fastest, most efficient way. To get an idea of how G.E.'s brand new plant mass-produces RM-ASA medium transformers, just turn the page and take an armchair tour . . .

422-9

GENERAL ELECTRIC

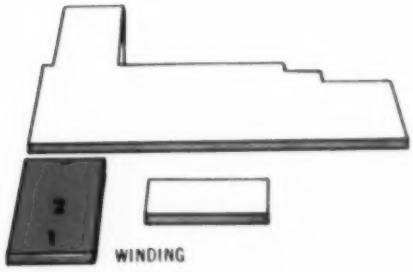
Mechanized material flow, new processes produce your G-E transformers when you need them

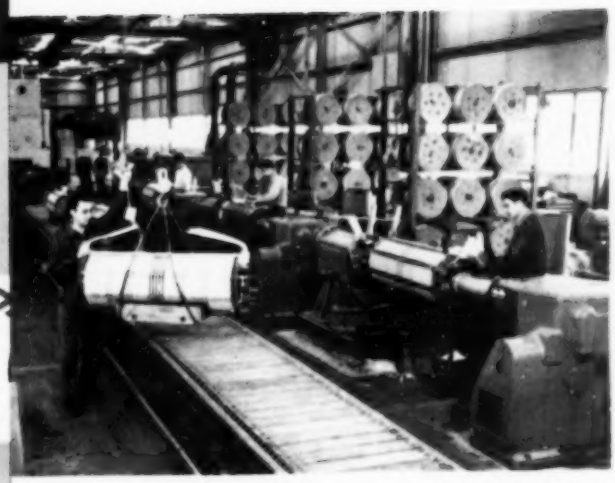
At the very start, the men who planned General Electric's new Rome plant were handed a simple challenge: to create the finest possible facility for making high-quality standard-design transformers in the shortest possible manufacturing time.

They did their planning carefully. First, they figured out how each manufacturing step could be performed best, taking advantage of new processes and modern materials handling methods. Next, they designed the plant area to match the work needed for each step. Then they blended all of these operating steps set up a continuous manufacturing process, with all material following a smooth, in-line flow.

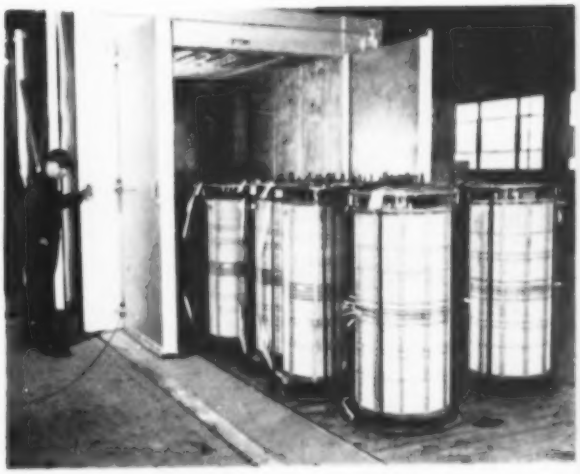
These General Electric planning engineers had no preconceived plant shape or area to tie them down. Instead, they worked out, with seasoned production men and transformer engineers, the most efficient repetitive manufacturing facility for transformers in the country today. The result is more than just a new, fast-moving, high-output plant. It is a way of giving you RM-ASA transformers of the most modern design and built to exacting quality standards . . . *when* you need them. General Electric Company, Schenectady 5, New York.

3-D MODEL helped to determine size and shape of plant buildings. Coil winding area is reviewed by W. S. Ginn, General Manager of G.E.'s Power Transformer Dept. (right), and D. B. Lawton, Manager of new Rome plant.



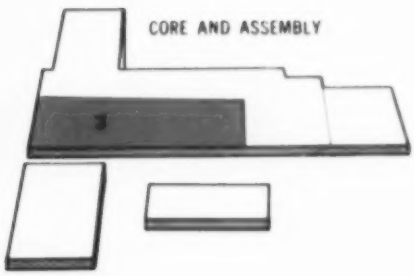


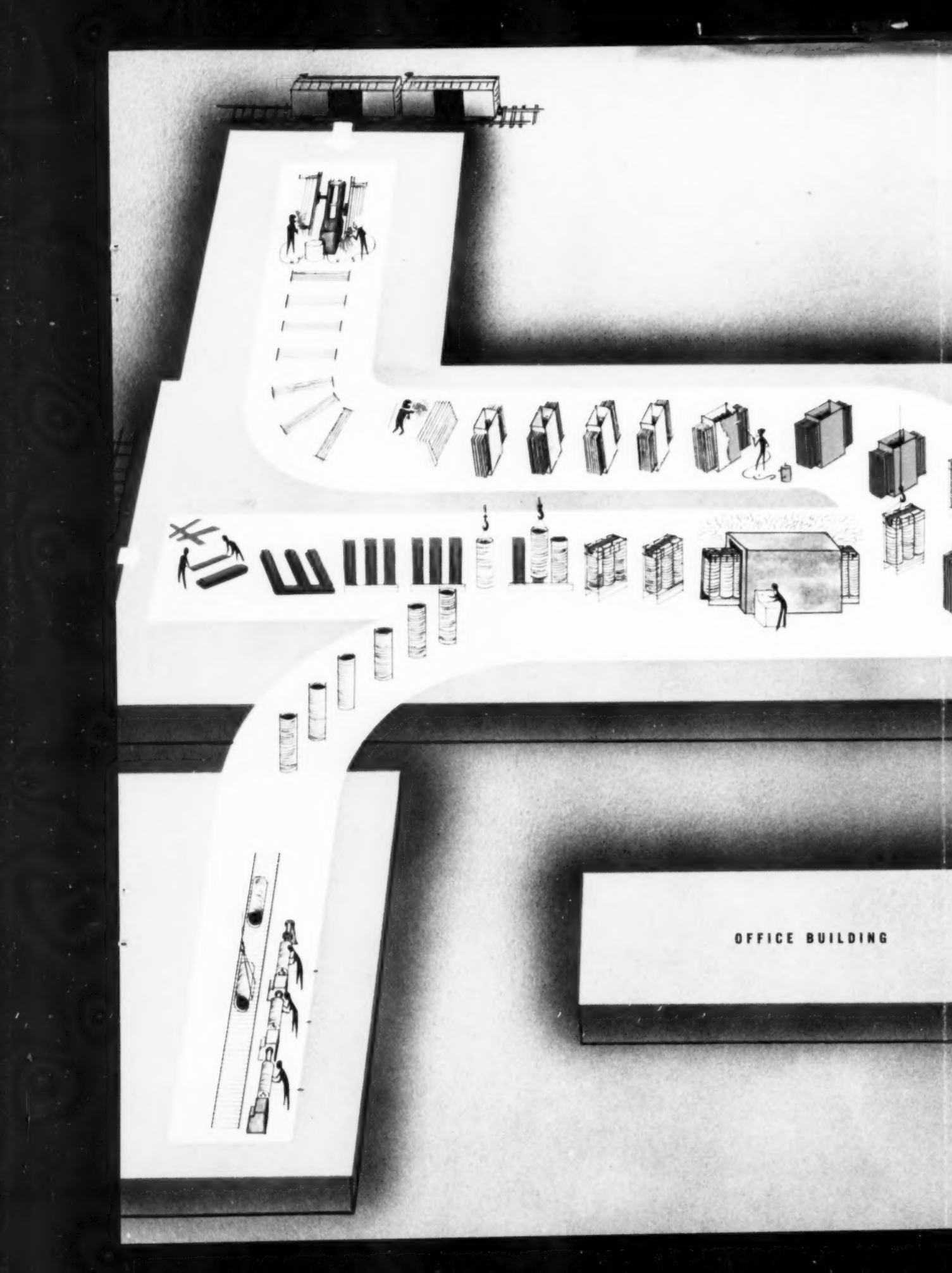
1. Banks of precision winding machines flank both sides of moving conveyor. Overhead crane lifts completed coil onto conveyor, which moves toward drying oven (rear).

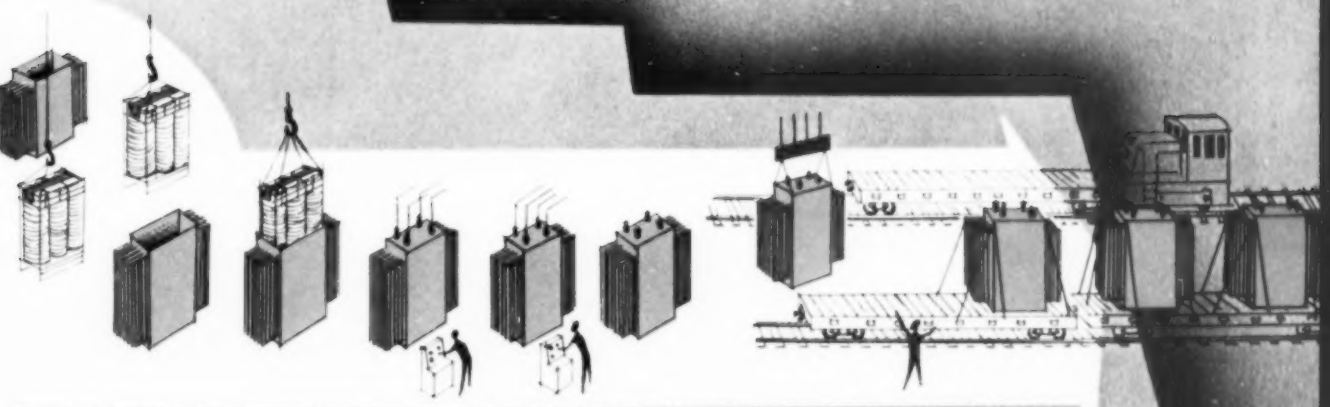


2. "Moving sidewalk" conveyor carries coils into oven, where they will be dried for about 12 hours. All along the line, mechanized handling speeds production.

3. Meanwhile, the core is prepared by cutting, stacking, and then annealing steel in an oven to improve its electrical quality. Steel is cherry red when it leaves the oven for cooling.




OFFICE BUILDING



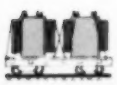
RAW MATERIALS enter plant at point nearest which they will be used

COILS are wound, dried, tested, then taken to assembly area by conveyor

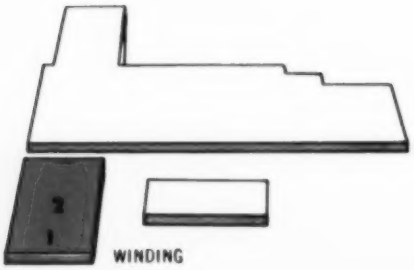
CORES are cut, annealed, stacked, then set on conveyor for assembly with coils

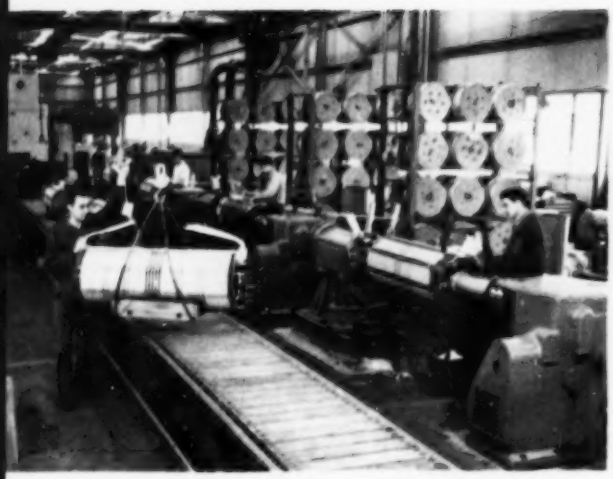
TANKS are fabricated, painted and baked, then conveyed to assembly bay

ASSEMBLED TRANSFORMER moves through successive test berths on dragline conveyor



LOADED ON FLATCARS, transformers are shipped to electric utilities and industrials across the nation





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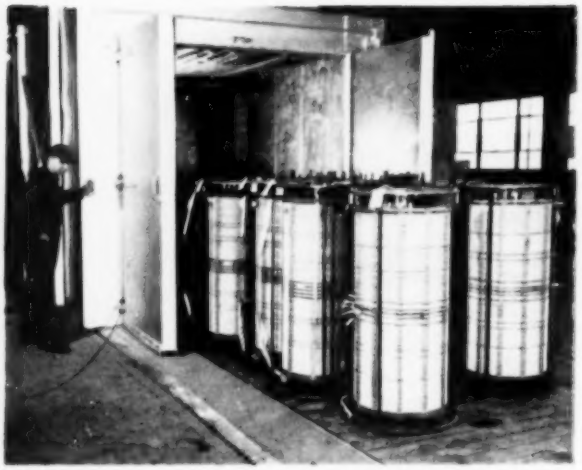

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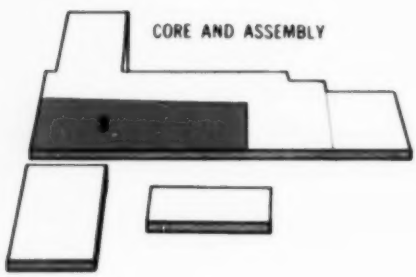
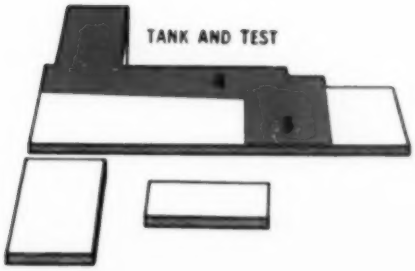
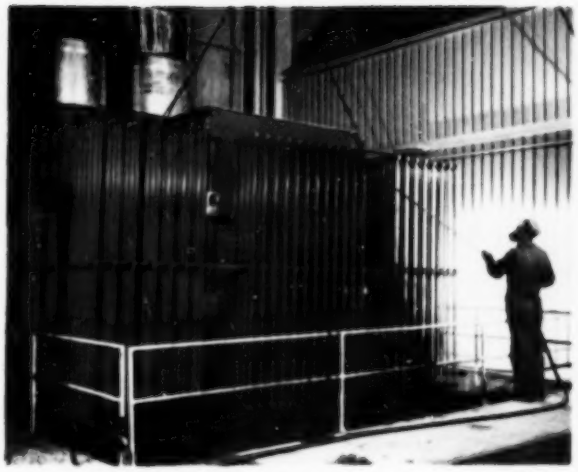


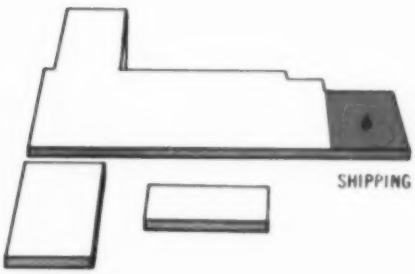




4. Tanks are flow-painted in booths specially designed with overhead conveyors, which also bring them to conveyorized baking oven after each coat of paint is applied.

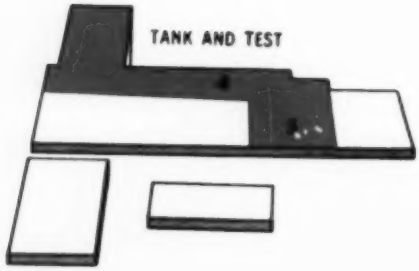
5. After core-and-coils are put in tank, transformer moves to test area. Dragline conveyor moves transformers to successive stations for series of production tests.

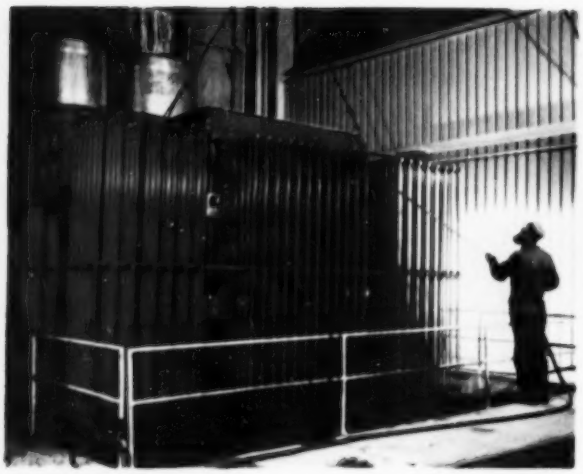
6. On their way to locations across the country are some of the RM-ASA transformers built at Rome.



Progress is our most important product

GENERAL ELECTRIC





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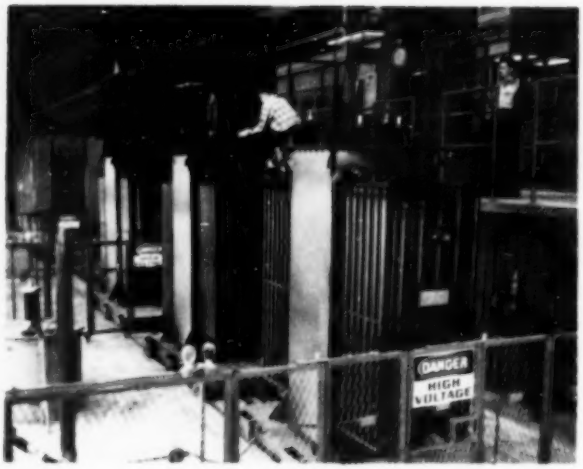

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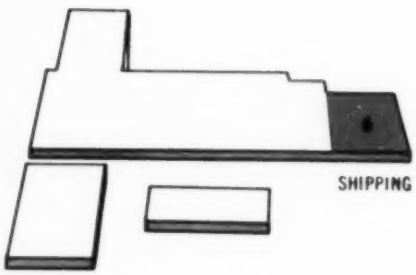

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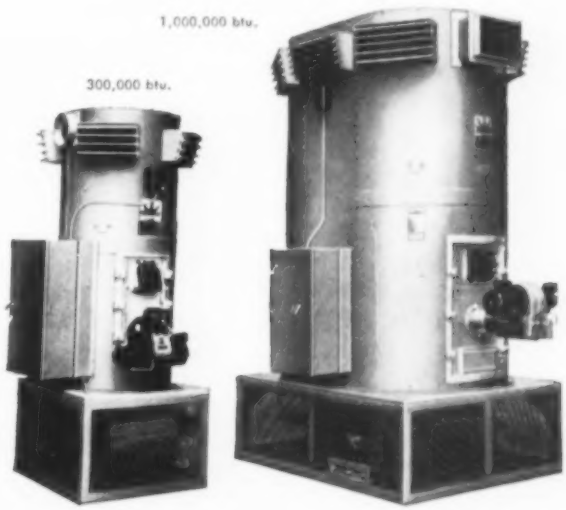

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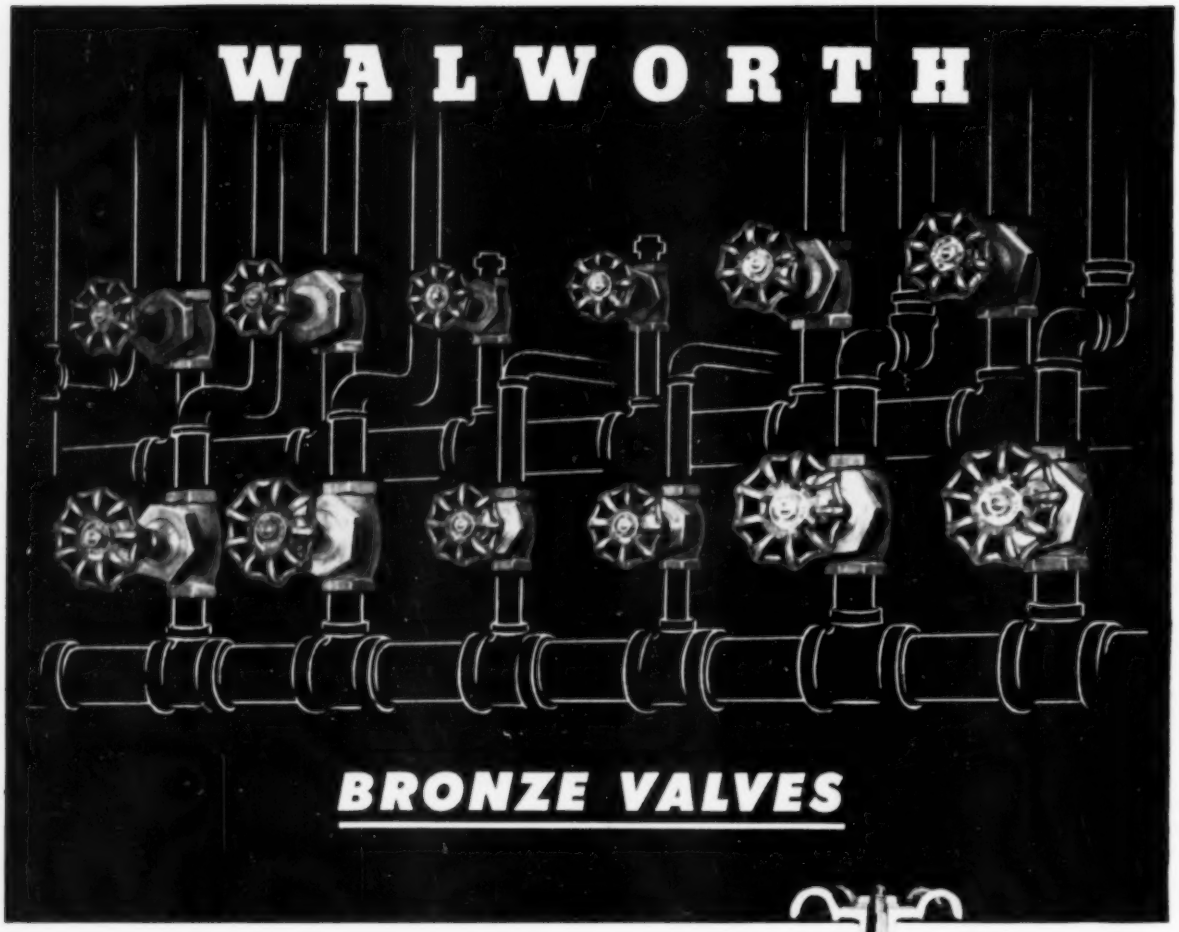

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5/8"	3/8"	DIAMOND No. 449 ANSI STD No. 50
3/4"	1/2"	DIAMOND No. 433 ANSI STD No. 60
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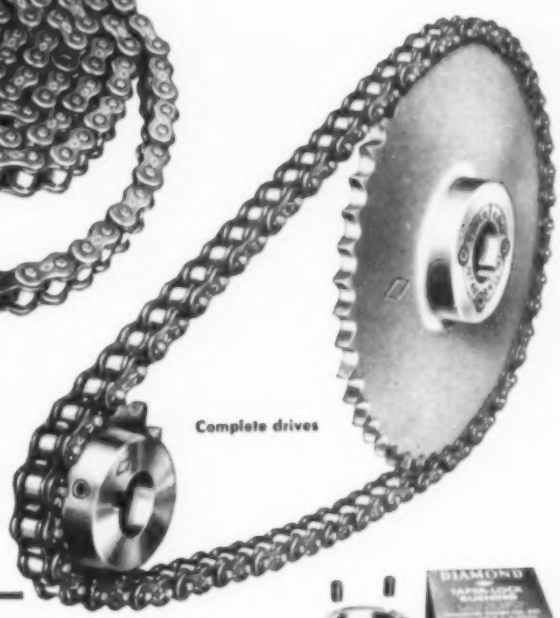

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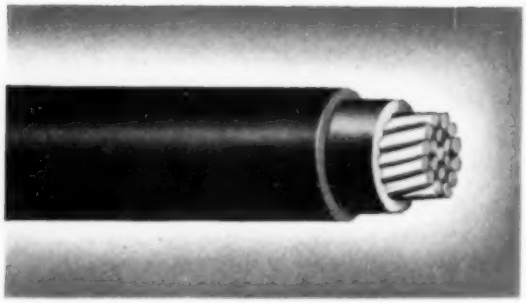
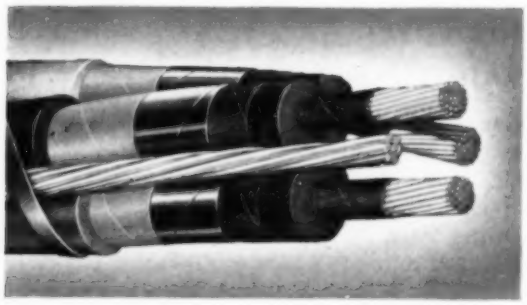
install U. S. GRIZZLY® POWER CABLES



U. S. Grizzly Power Cable, 600 volts—Type RR single conductor, Hydrosec®—S heat- and moisture-resistant insulation, Neoprene jacket.



U. S. Grizzly Power Cable, 5,000 volts—Type RR—3-conductor, Uskorona®—ozone-resistant insulation—shielded—Neoprene jacket.

1. Lighter in weight than lead-sheathed cables and lead-sheathed armored cables.
2. Greater flexibility
3. Easier to handle during installation
4. Easier to splice, tap and terminate
5. More resistant to chemical corrosion
6. Unaffected by stray currents
7. Better protection against weathering
8. Longer life
9. Cost less
10. Made by United States Rubber Company, the *only* electrical wire and cable producer to grow its own natural rubber, make its own synthetic rubber and manufacture its own plastics

U. S. Grizzly Power Cables are used for general power distribution, and can be installed in conduits, underground ducts, buried directly in the ground, or installed aerially. Neoprene jacket protects against acids, alkalies, oils, and mechanical damage and weathering. (All IPCEA and NEMA specifications complied with.)

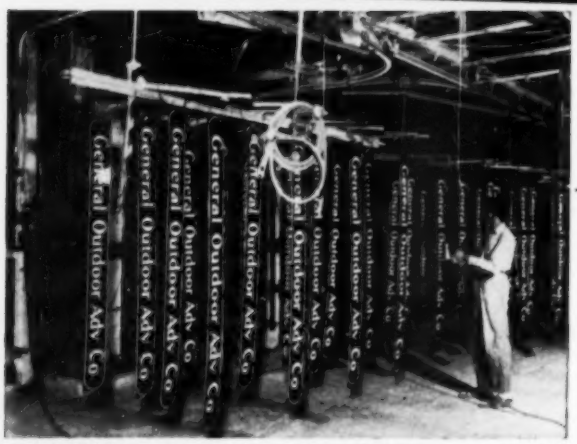
Write to address below for free catalog, U. S. Electrical Wires and Cables.

US RUBBER

UNITED STATES RUBBER COMPANY

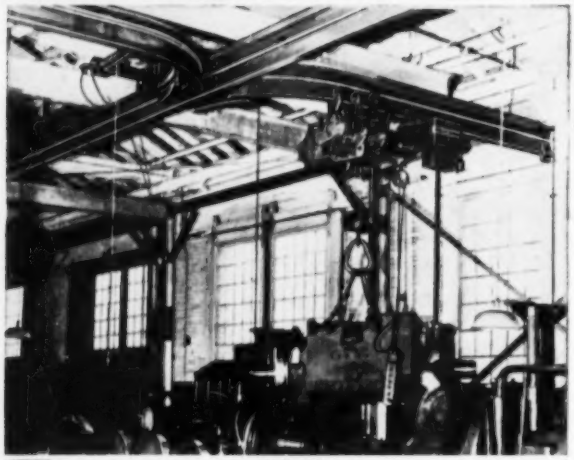
ELECTRICAL WIRE AND CABLE DEPARTMENT, ROCKEFELLER CENTER, NEW YORK 20, N. Y.

what MONORAIL can do . . .



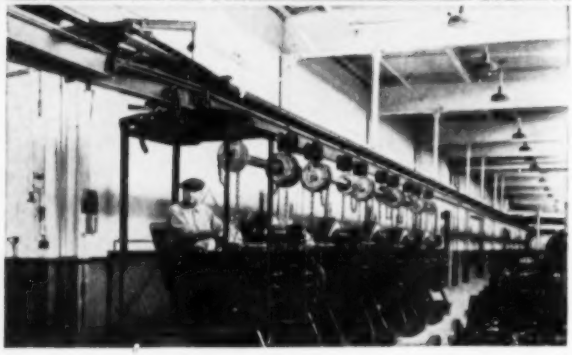
WHERE SPACE IS LIMITED

MonoRail relieves operating congestion by transferring materials handling to unused overhead area. Equipment can often be installed with no loss of production.



TO MOVE VARIABLE LOADS

Any size or shape of load, within the capacity of a MonoRail system, can be moved by using slings, grabs or other quickly changed "below the hook" devices for hand or electric operation.



FOR LOW MAINTENANCE COSTS

American MonoRail equipment is specially engineered and carefully built for long-life, rugged service. Manual or automatic operation continues with little or no downtime for maintenance or repair.

Send for Bulletin C-1 illustrating hundreds of successful MonoRail installations.

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AMERICAN MONORAIL COMPANY

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You Pay More For HEAT-FAG...

... than for the blower that keeps men cool

When hot, stagnant or fume-filled air distresses your men, your production suffers too.

Give men around furnaces or hot processes, or in confined areas, a steady supply of fresh, cool air with Coppus Blowers and Exhausters and watch their efficiency jump to a more profitable level.

There's a portable, easily adaptable Coppus "Blue Ribbon" product for practically any fresh-air requirement. The Coppus "Blue Ribbon" is the sign of precision workmanship and trouble-free, long-lasting operation. Check and mail the coupon for exact information. Sales offices in THOMAS' REGISTER. Other "Blue Ribbon" Products in CHEMICAL ENGINEERING CATALOG, REFINERY CATALOG, BEST'S SAFETY DIRECTORY, MINING CATALOGS.

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Six frame sizes —
1 to 150 horsepower

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Six frame sizes —
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FANMIX GAS-OIL BURNER

MAIL THIS COUPON To Coppus Engineering Corp., 246 Park Avenue, Worcester 2, Mass

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COMPANY .....

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(Write here any special ventilating problem you may have.)

A NEW LANGUAGE FOR INDUSTRY

as interpreted by 33 experts and proclaimed in

SOUTHERN POWER and INDUSTRY

NEW PRODUCTION concepts and methods of Power and Industrial Instrumentation loom large in the forefront of today's plant design, operation and maintenance. Unfortunately, the very newness that makes these concepts and methods so vital, also causes confusion even among the men who use them most. Due to the continuous changes and additions in this new language—spontaneously invented, in many cases—exact definitions of its new terms are virtually impossible to find.

Recognizing the need for a more thorough knowledge of this terminology, which very few people actually understand, the editors of SOUTHERN POWER AND INDUSTRY, in the February 1954 issue, published a dictionary of some of the more important instrumentation terms as interpreted by 33 instrumentation experts in all phases of industry. Since publication, 141 different companies have written in to request a total of 2925 reprints. . . .

. . . this is reader acceptance.

The following list, some of the companies which have requested reprints of the Instrumentation Article, includes many of the biggest names in American Industry—PLUS—and a big plus it is, the up-and-coming smaller companies which comprise the bulk of the region's rapidly expanding economy.

Inquiries were received from such Southern plants as . . .

Coosa River Newsprint Co., Coosa Pines, Ala.
Mutual Chemical Co. of America, Baltimore, Md.
Rome Kraft Co., Rome, Ga.
E. I. Du Pont de Nemours & Co., Charleston, W. Va.
Shell Oil Co., Kilgore, Tex.
Standard Oil Co., Sugar Creek, Mo.
Bell Telephone Laboratories, Burlington, N. C.
Columbia-Southern Chemical Corp., Corpus Christi, Tex.
Green River Steel Corp., Owensboro, Ky.
Carbide & Carbon Chemicals Co., S. Charleston, W. Va.
The Crown Cork & Seal Co., Baltimore, Md.
Celanese Corp. of America, Cumberland, Md.
American Viscose Corp. of America, Parkersburg, W. Va.
Reynolds Alloys Co., Sheffield, Ala.
International Minerals & Chemical Corp., Bartow, Fla.
Colonial Sugars Co., Gramercy, La.
Westinghouse Electric Corp., Baltimore, Md.
Aladdin Industries Inc., Nashville, Tenn.
American Cast Iron Pipe Co., Birmingham, Ala.
Dow Chemical Co., Freeport, Tex.
Gulf States Utilities Co., Beaumont, Tex.

. . . in addition, recognition of the excellence of the article comes from such prominent national companies as . . .

Weston Electrical Instrument Corp., Newark, N. J.
The Texas Co., Beacon, N. Y.
Heintz & Co., Inc., Los Angeles, Calif.
Bailey Meter Co., Cleveland, Ohio
General Electric Co., West Lynn, Mass.
Worthington Corp., Harrison, N. J.
Builders-Pacific, Inc., Berkely, Calif.
Fisher Governor Co., Marshalltown, Iowa
The Terry Steam Turbine Co., Hartford, Conn.
The Bristol Co., Chicago, Ill.
Barrett & Yost, Seattle, Wash.
Taylor Instrument Co., Rochester, N. Y.
Powerlite Devices, Ltd., Toronto, Canada
Mason-Neilan Regulator Co., Boston, Mass.
The Mead Corp., Chillicothe, Ohio
Belco Industrial Equipment Div., Paterson, N. J.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
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The Dorr Co., Stamford, Conn.
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WITH national defense policy demanding greater decentralization for security purposes . . . with the search for new plant sites and areas for development created by the natural growth of the nation's economy . . . more and more industries are turning to the rich natural resources, year-'round mild climate, and plentiful labor supply which the South and Southwest offer. Each day sees the arrival of new industries and the expansion of existing ones . . . it is the fastest growing industrial region in the country.

SOUTHERN POWER AND INDUSTRY serves the growing industrial strength of this new frontier. It is the "hometown" magazine of Southern industry.

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Speed heat-up with Armstrong thermic bucket traps. When steam is first turned on, air is pushed out the large thermic vent—fast! As soon as steam reaches the trap a thermic strip closes the vent, then the bucket functions as a regular bucket. Traps with thermic vent buckets discharge air 50 to 100 times faster than other traps.

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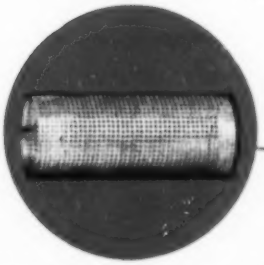
Just specify Armstrong with internal check valve. No check valve installation labor or fittings needed. Spring loaded action and vertical position minimize danger of dirt holding valve open. The Armstrong internal check valve is top quality—long lasting.



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Save money with Armstrong built-in strainer traps. They cost less than a separate trap and strainer and save installation time and money. Stainless steel screen lasts a long time.

Get the full facts about all Armstrong traps. Send today for free Catalog J, The Armstrong Steam Trap Book.

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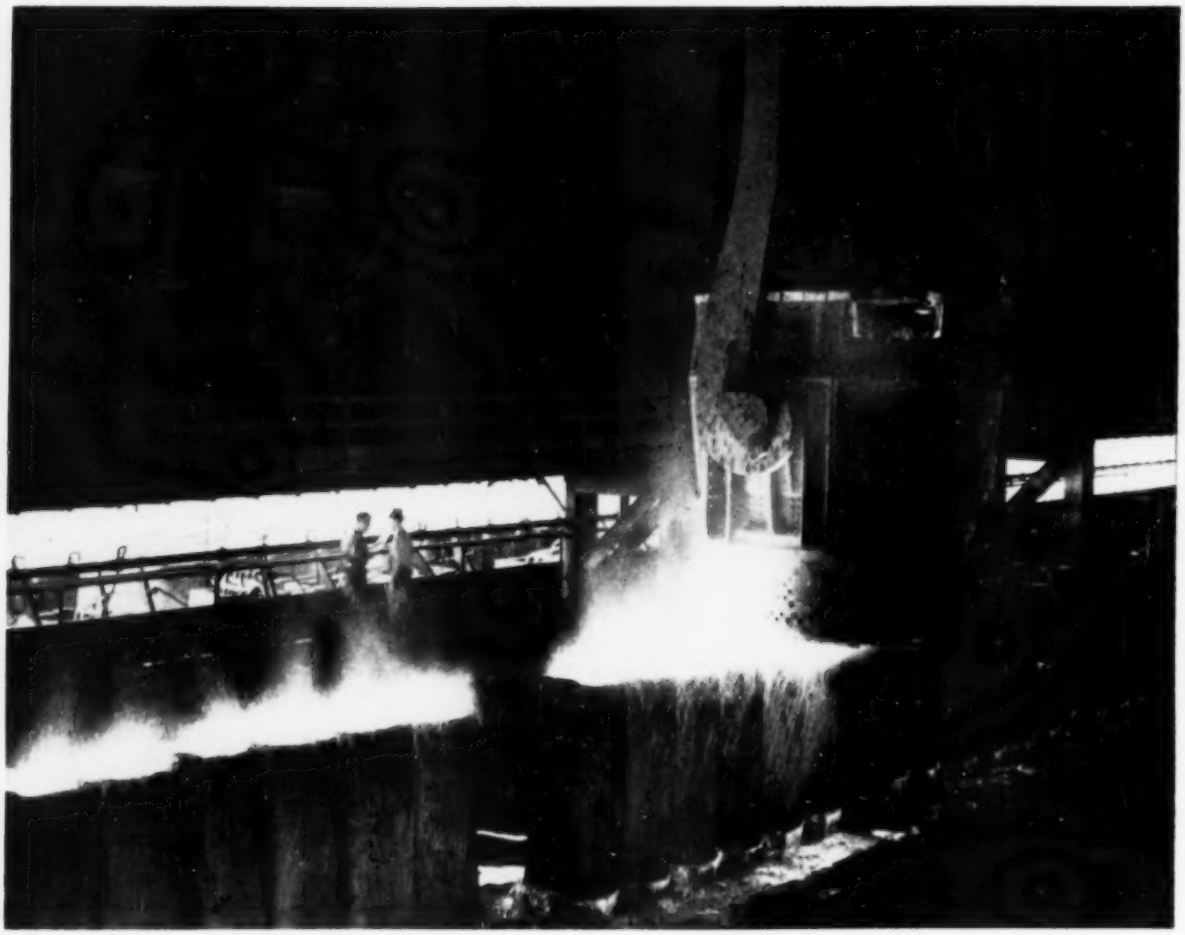
ARMSTRONG STEAM TRAPS

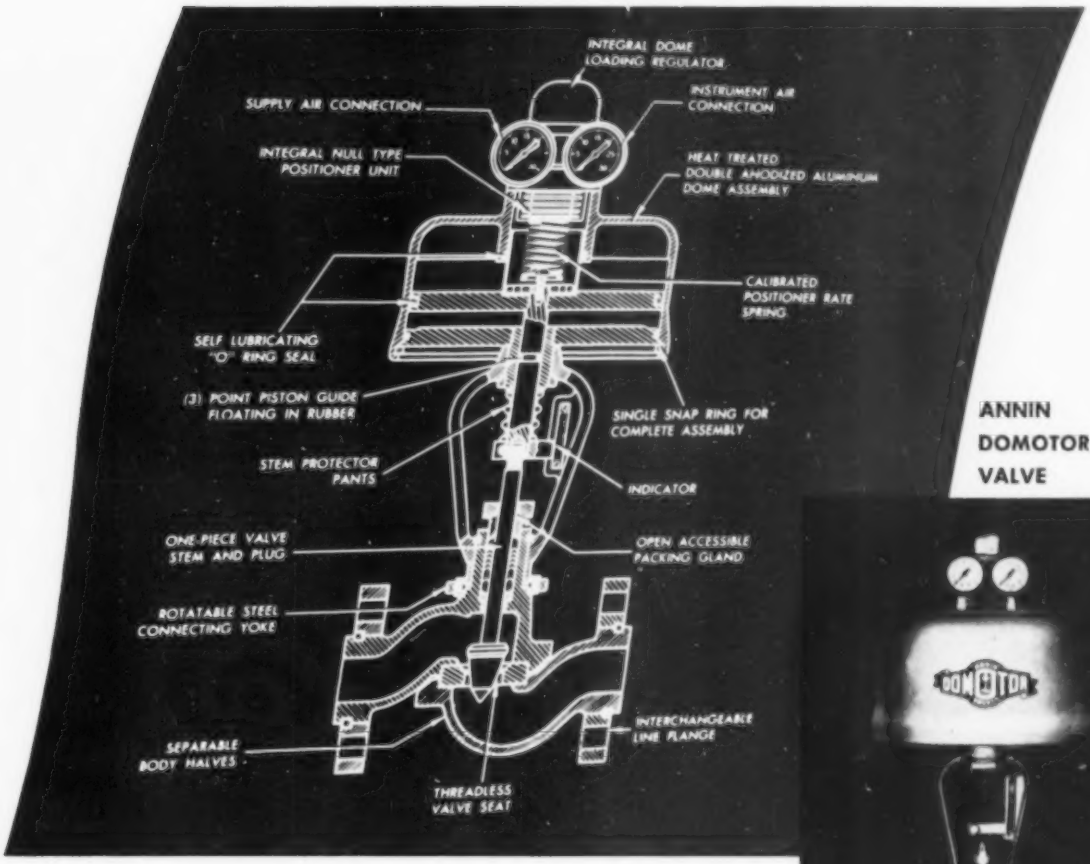


The Eyes of Taxes Are Upon You

PRESENT DAY TAXES and production costs, plus the competitive conditions existing in industry today, make production *economies*, or *increased* production, almost essential . . . Correct lubrication can play a major part in *both!* The *exactly-right* lubricant for each machine will effect production economies by reducing power consumption, machinery wear (and subsequent replacements), and maintenance costs . . . On the increased production side, correct lubricants can be of vital assistance in enabling machinery to operate faster and longer, and reducing "downtime" by extending the time between scheduled overhauls . . . Your Standard Oil representative is qualified, by training and long experience, to assist you in the selection of *correct* lubricants. He knows a lot more about lubricants than just the selling of them. Why not call him in?

Standard Oil Company
(KENTUCKY)

STANDARD OIL
LUBRICANTS


INTEGRAL DOME LOADING REGULATOR
SUPPLY AIR CONNECTION
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CALIBRATED POSITIONER RATE SPRING
SELF LUBRICATING "O" RING SEAL
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INDICATOR
ONE-PIECE VALVE STEM AND PLUG
OPEN ACCESSIBLE PACKING GLAND
ROTATABLE STEEL CONNECTING YOKE
INTERCHANGEABLE LINE FLANGE
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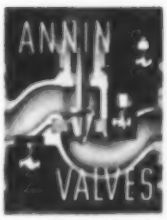
THREADLESS VALVE SEAT

ANNIN DOMOTOR VALVE

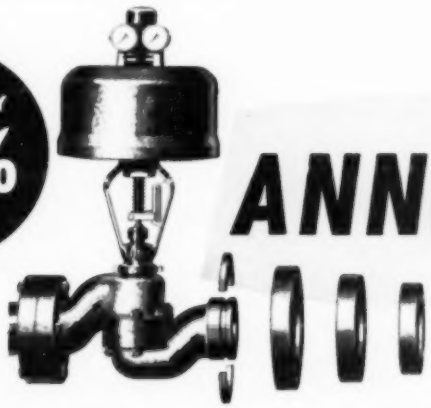
We ~~want~~ GET the Tough Jobs!

When precise control of hard-to-handle fluids is required, engineers and production men have learned from experience to depend on Annin Valves. Designed for long life, low maintenance, and efficient operation, Annin Valves are widely used to control erosive and corrosive fluids under a wide range of temperatures and pressures. Interchangeability of valve bodies, flanges, operators, and plug assemblies lowers the initial investment and cuts inventory requirements.



♦ **WRITE TODAY** *for illustrated bulletin showing how and why Annin offers the best buy in control valves.*

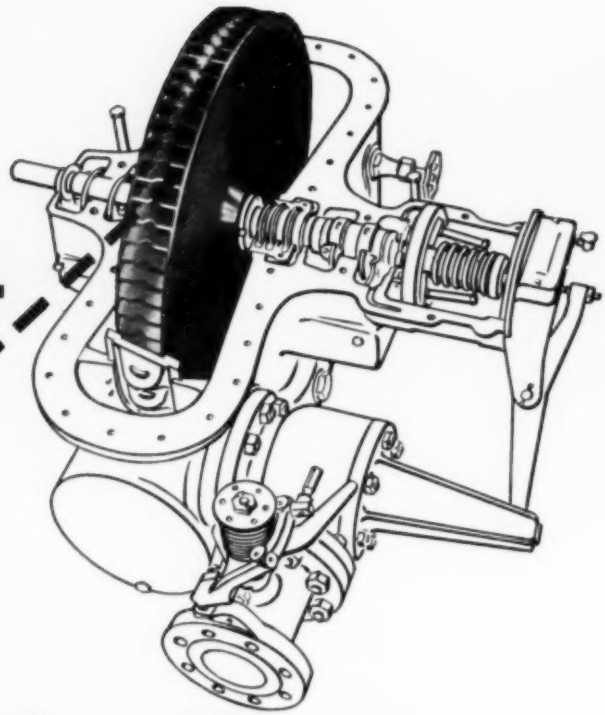
CUT INVENTORY **50%** WITH

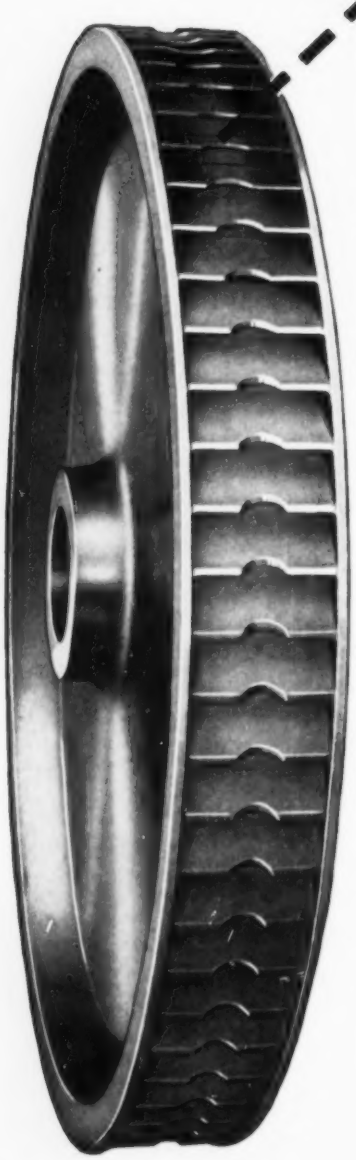


ANNIN *Control* **VALVES**

THE ANNIN COMPANY 3500 Union Pacific Avenue
Los Angeles 23, California

TERRY SOLID WHEEL





..."trade mark" of a trouble-free turbine

This is the rotor of a Terry solid-wheel turbine. There are a number of reasons why it has become a symbol for reliable, trouble-free operation.

First, because the wheel is a single forging, in which a series of semi-circular buckets is milled, there are no separate parts to become loose or work out.

Second, because the power-producing action of the steam takes place on the curved surfaces at the back of the buckets, blade wear is of little consequence. Wear does not materially affect horsepower or efficiency.

Third, because the steam enters the buckets in a direction at right angles to the shaft, there is no need for close axial blade clearances. The blades cannot foul. There is a one inch clearance on either side of the wheel. In addition, the blades are double rim protected.

These are only a few of the reasons why the Terry solid wheel has become a "Trade Mark" for trouble-free turbine performance. For complete details, send for a copy of bulletin S-116. No cost or obligation.

THE TERRY STEAM TURBINE CO.
TERRY SQUARE, HARTFORD 1, CONN.

TERRY

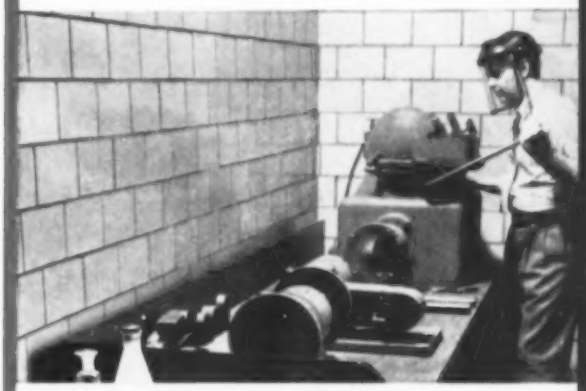
TT-1197

◀ Heat-treating and physical testing equipment shown at left is used for quality control of welding operators and for development of new welding procedures.

▲ This Rockwell hardness testing machine measures the hardness of weld specimens as a guide to proper procedures for heat-treating of welds.

Daily rigid testing is your insurance of quality welds in

NAVCO FABRICATED PIPING



▲ A laboratory technician cuts a sample from a pipe weld prior to grinding and polishing for metallographic examination.

At Navco, a continuous parade of weld specimens are processed in the new, modern physical-chemical testing laboratory. It is here that weldments are studied metallographically and tested physically—all on a rigid schedule of quality control practices. Navco customers have benefited from progressive quality control practices for more than 40 years; they have come to know that piping installations, engineered, fabricated and erected by Navco, are precise, accurate and dependable.

Call on NAVCO for your next piping job.

▲ Here a weld specimen is etched to outline the grain structure for further metallographic study.

NAVCO

NATIONAL VALVE & MANUFACTURING COMPANY

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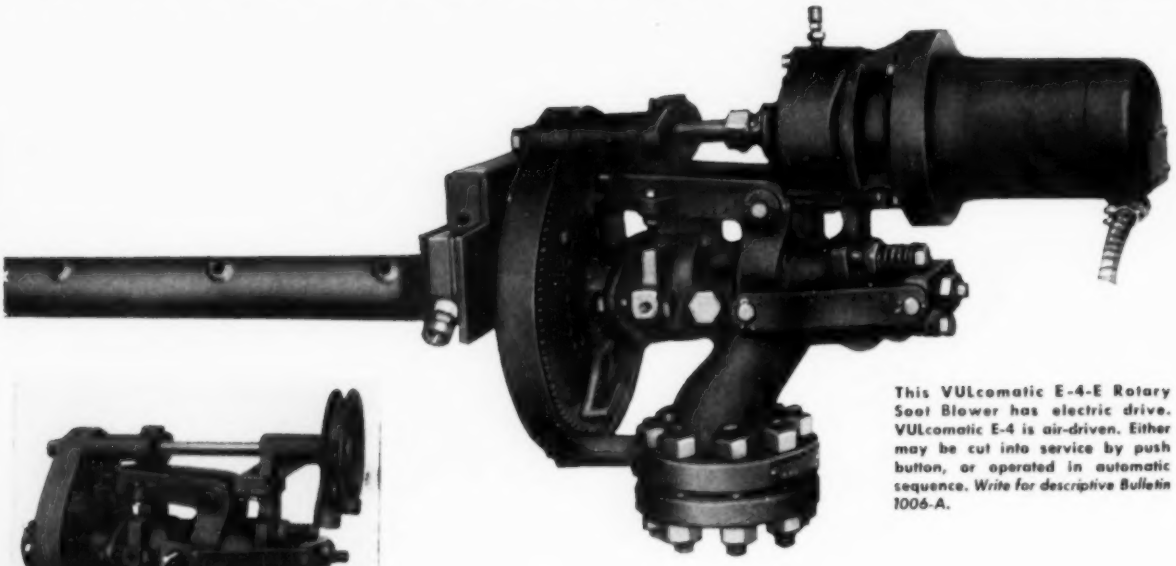
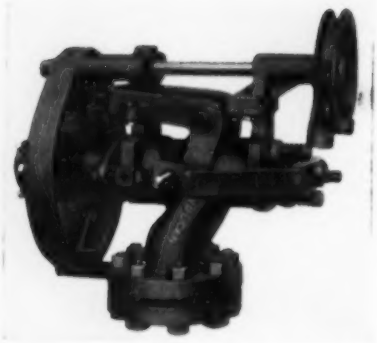
Here's the answer to SOOT *and* DUST REMOVAL



This VULcomatic E-4-E Rotary Soot Blower has electric drive. VULcomatic E-4 is air-driven. Either may be cut into service by push button, or operated in automatic sequence. *Write for descriptive Bulletin 1006-A.*



Manually-operated Vulcan P-3 is identical with VULcomatic E-4-E or E-4, except for drive. May be quickly converted to an automatic unit by replacing sheave wheel with air or electric motor. *Bulletin 1005-A.*

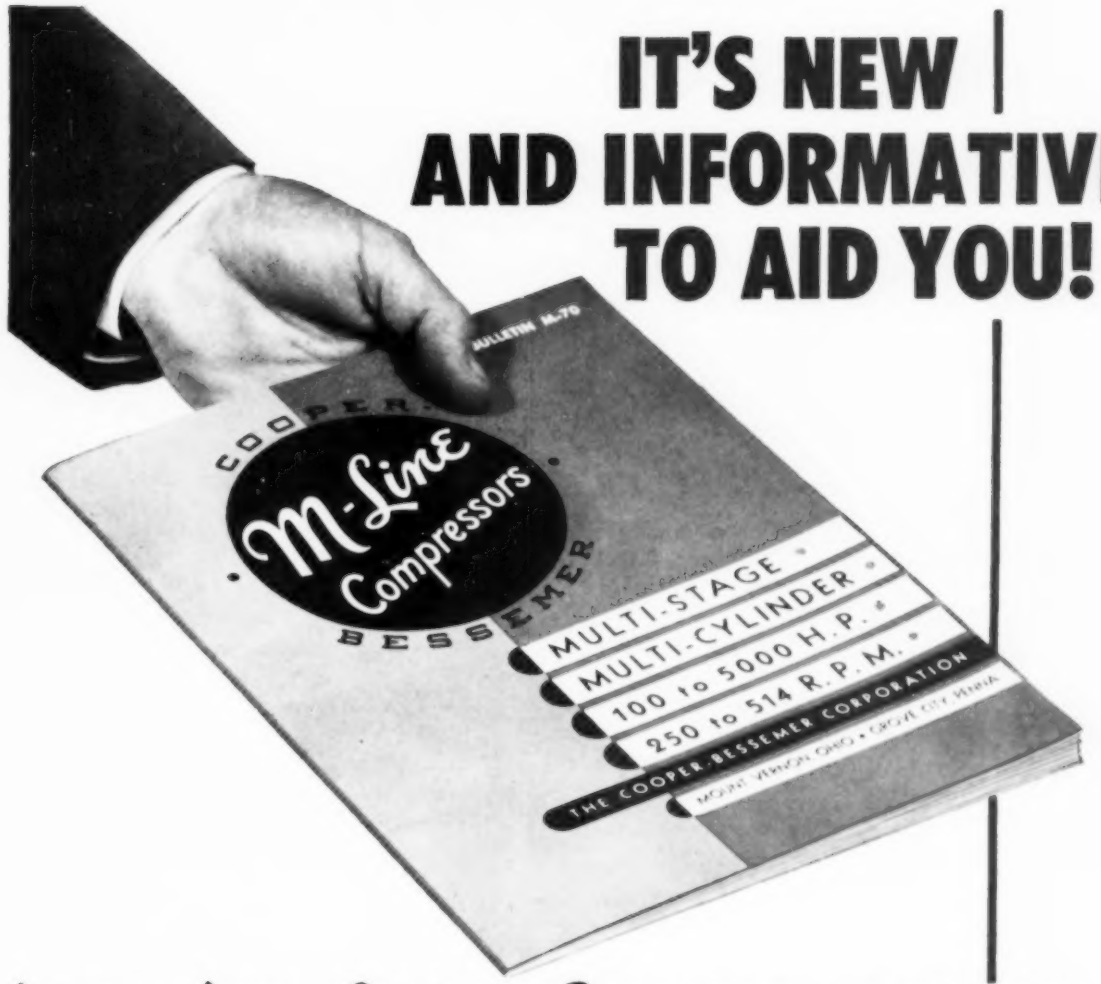
MOTOR DRIVE or MANUAL

With Vulcan Rotary Soot Blowers, you get full cleaning pressure—from the crack of the valve to the end of the cycle. Exclusive trigger-action valve assures uniform speed of rotation for better cleaning, and closes automatically. While closed, it seals off corrosive furnace gases to protect internal parts. You can install Vulcan Rotaries at any angle. You can inspect or repair any part—with an ease that saves maintenance time and money.

COPES-VULCAN DIVISION
Continental Foundry & Machine Company
ERIE 4, PA.

VULCAN Rotary SOOT BLOWERS

IT'S NEW | AND INFORMATIVE TO AID YOU!



Learn how Cooper-Bessemer compressors can cut your costs!

THE new Cooper-Bessemer M-Line Bulletin offers you complete information on economically meeting compressor requirements from 100 to 5000 horsepower. This interesting 44-page booklet simply and fully explains how and why Cooper-Bessemer compressors assure you maximum trouble-free performance at minimum operating expense.

Additional bulletin features include complete data on design, lubrication, automatic controls, cylinders, motor and drives, specifications and photographs of various compressor installations. Cooper-Bessemers offer you new, unusual plus features that are paying off in job after job. To find out about them, send for your M-Line Bulletin today.

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THE COOPER-BESSEMER CORPORATION
Mount Vernon, Ohio

Please send me Bulletin M-70 on Cooper-Bessemer M-Line Compressors.

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Company .....
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ERIE CITY VL STEAM GENERATOR

This one, fired by the Erie City Dumping Grate Spreader Stoker. Erie City VL's by the hundreds are serving a broad cross section of small to large steam users. These completely factory-assembled or field erected steam generators incorporate a 2-drum boiler and integral water cooled furnace for any mechanical firing method. We draw upon a 50 year experience with 2-drum boilers and a pioneering application of water wall design that keeps refractory maintenance to a minimum.

Only clean water can enter the integral water wall circulation. VL's are the most accessible boilers of this type—easy to keep clean and at top efficiency. Hospitals, Schools, Institutions, Dairies, Laundries, Industries and Process Plants use and repeat on VL's.

A FEW OF THE HUNDREDS OF ERIE CITY VL USERS

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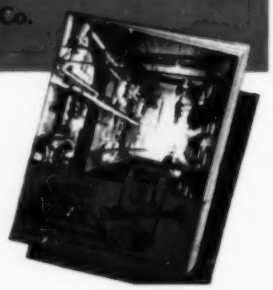
Dow Chemical Co. Bayer Company
General Chemical Co.
Pure Oil Company Liquid Carbonic Corp.
American Zinc Co. of Illinois
American Cyanamid Co.
Welch Grape Juice Co.



Get the COMPLETE STORY . . . on this modern 2-DRUM Steam Generator for all mechanical firing methods. *Ask for* SB-43B

ERIE CITY
112 Years in Steam Generation

You can depend on Erie City for sound engineering

ERIE CITY IRON WORKS • *Erie, Pa.*

STEAM GENERATORS • SUPERHEATERS • ECONOMIZERS • AIR PREHEATERS
UNDERFEED AND SPREADER STOKERS • PULVERIZERS

how to provide
PROTECTION · *PLUS*

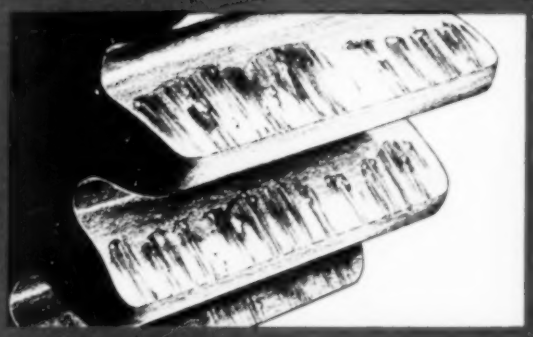
SWITCH TO GULF E.P. LUBRICANTS

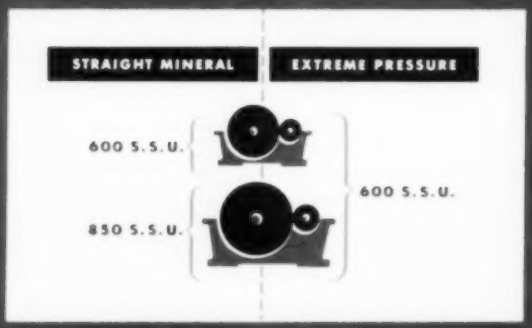
. . . and save maintenance dollars!

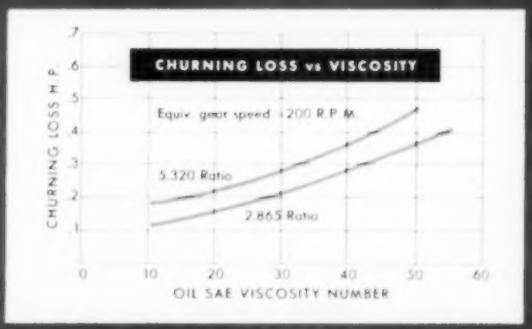
Gulf E. P. Lubricants combine all the properties that count in an extreme pressure lubricant: high film strength, excellent rust preventive properties, good water-separating characteristics, good stability, and they are noncorrosive, nonfoaming. Their use insures longer gear and bearing life and lower maintenance costs for gear drives under a wide range of operating conditions.

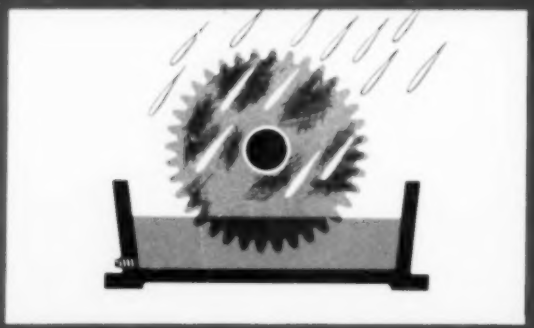
Gulf E. P. Lubricants are available in the proper viscosity for every gear requirement ranging from 55 to 1000 SUV at 210 deg. F. For specific recommendations for your equipment, call in a Gulf Sales Engineer today. Write, wire, or phone your nearest Gulf office or send the coupon on the last page.

GULF INDUSTRIAL LUBRICATION









Practical advantages of Gulf E. P. Lubricants:

More effective protection against tooth scoring and welding

Gulf E. P. Lubricants are specially compounded to provide extra film strength and to prevent metal-to-metal contact under most conditions of overload and shock load. That's why, when you use Gulf E. P. Lubricants, you can usually avoid tooth damage like that shown at the left and have an extra margin of protection when production demands approach or exceed the rated capacity of the equipment.

Fewer lubricant grades needed—lubricant storage and handling simplified

Because Gulf E. P. Lubricants have superior film strength, it is often feasible to use a lower viscosity grade than would be possible with a straight mineral oil. This is a practical advantage for plants operating several different types of gear drives. If, as pictured at the left, two straight mineral oils of different viscosity are specified, one grade of Gulf E. P. Lubricant may well do the job of both. Thus lubricant storage and handling is simplified, and there is less chance for confusion in the oil house.

Reduced power loss caused by churning in splash-lubricated units—lower power costs

There is another advantage in using a lower viscosity oil in splash-lubricated units where power loss due to churning is appreciable. Since this loss is almost directly related to oil viscosity, the use of lighter Gulf E. P. Lubricants often means reduced heat generation and lower power costs.

The chart at the left shows the effect of viscosity on the churning loss in horsepower of a typical gear unit.

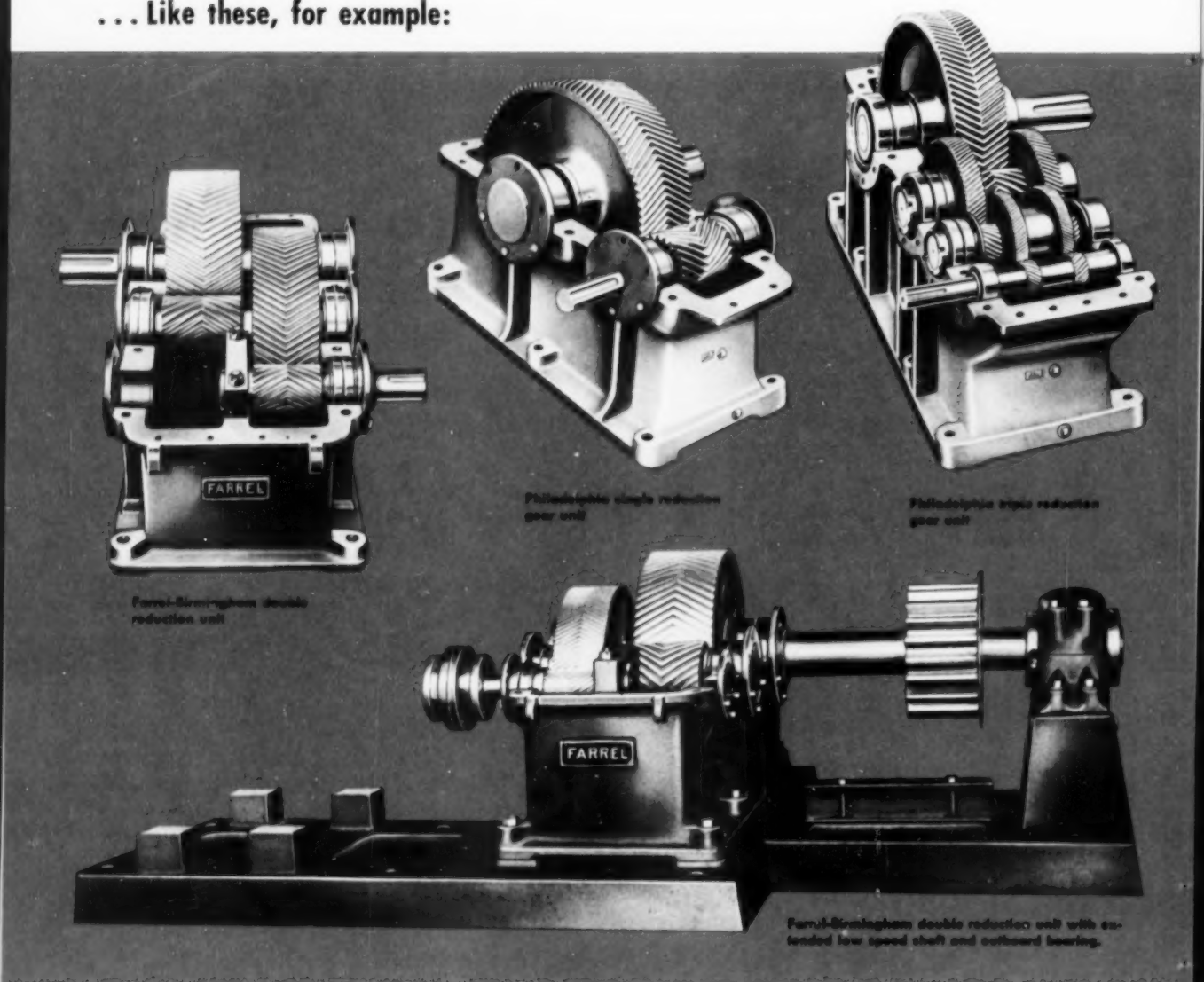
Excellent protection against rust

The ability to protect polished gear teeth and antifriction bearings against rust is an important property of a gear lubricant, and is essential in a lubricant for units which are occasionally idle.

Gulf E. P. Lubricants have highly effective rust preventive properties—insure against excessive wear and enlarged tolerances which might result from the presence of abrasive rust particles.

Gulf E. P. Lubricants are ideal for all types of gear drives

. . . Like these, for example:



Philadelphia single reduction gear unit

Philadelphia triple reduction gear unit

Farrel-Birmingham double reduction unit

Farrel-Birmingham double reduction unit with extended low speed shaft and outboard bearing.

GULF OIL CORPORATION · GULF REFINING COMPANY
1822 Gulf Building, Pittsburgh 30, Pa.

Gentlemen:

I would like further information on Gulf E.P. Lubricants:

- ☐ Please have a Gulf Sales Engineer call.
- ☐ Please send me a copy of your pamphlet "Gulf E.P. Lubricants for Reduction Gear Drives."
- ☐ Please arrange to show a group in our plant the new Gulf Color Slide Film, "Gears and Their Lubrication."

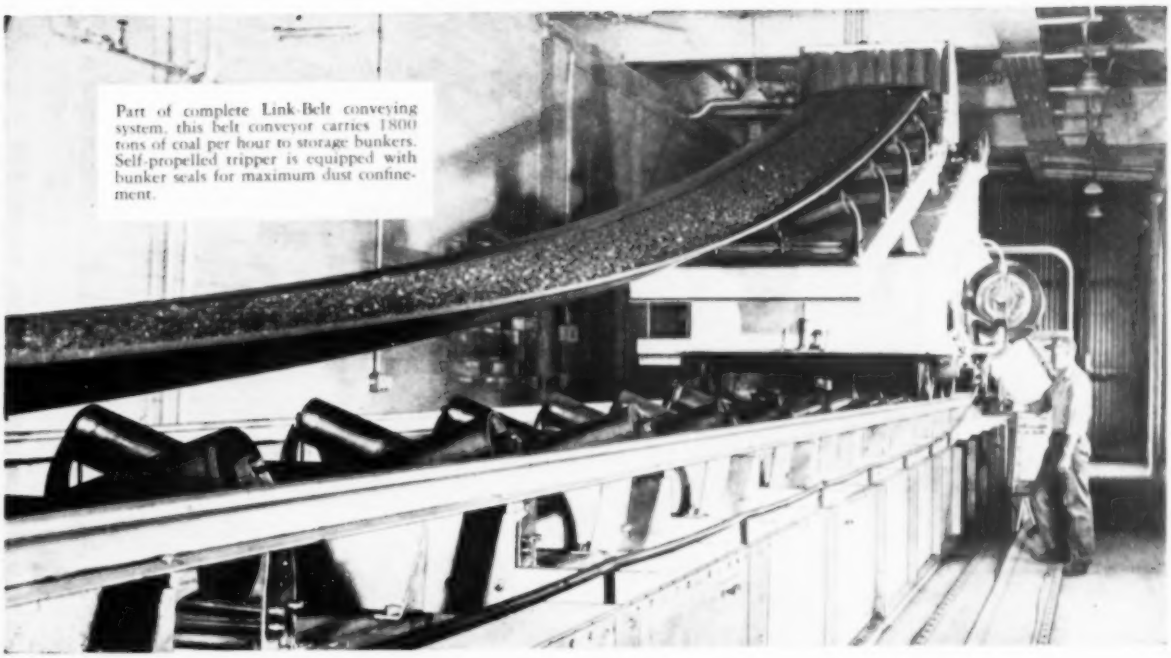
Name _____

Company _____

Title _____

Address _____

GULF INDUSTRIAL LUBRICATION



Part of complete Link-Belt conveying system, this belt conveyor carries 1800 tons of coal per hour to storage bunkers. Self-propelled tripper is equipped with bunker seals for maximum dust confinement.

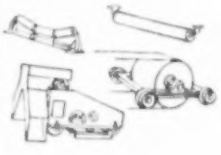
SURE ROAD TO LOWER HANDLING COSTS

... carry the load via Link-Belt belt conveyors

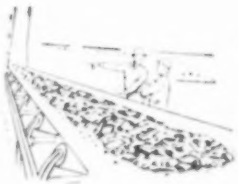
LINK-BELT offers you the "total engineering" so necessary for top efficiency

DESIGNED FOR OVERALL EFFICIENCY—Because of its unrivaled experience, Link-Belt can do a better job of gathering and analyzing all data. Proposals reflect this understanding of the most practical way to fit individual conveyors into your overall system requirements for best results.

BUILT FOR LONG-LIFE PERFORMANCE—Link-Belt manufactures all components and related feeders and conveyors. You are assured of the right equipment because of this breadth of line. And Link-Belt will supply the highest grade belts engineered to the specific job.



DELIVERS FULL RATED CAPACITY—Link-Belt follows through on every detail of the job, including electrical controls and even wiring and foundations. What's more, Link-Belt will furnish experienced erection superintendents, staffs and skilled crews at the customer's request.



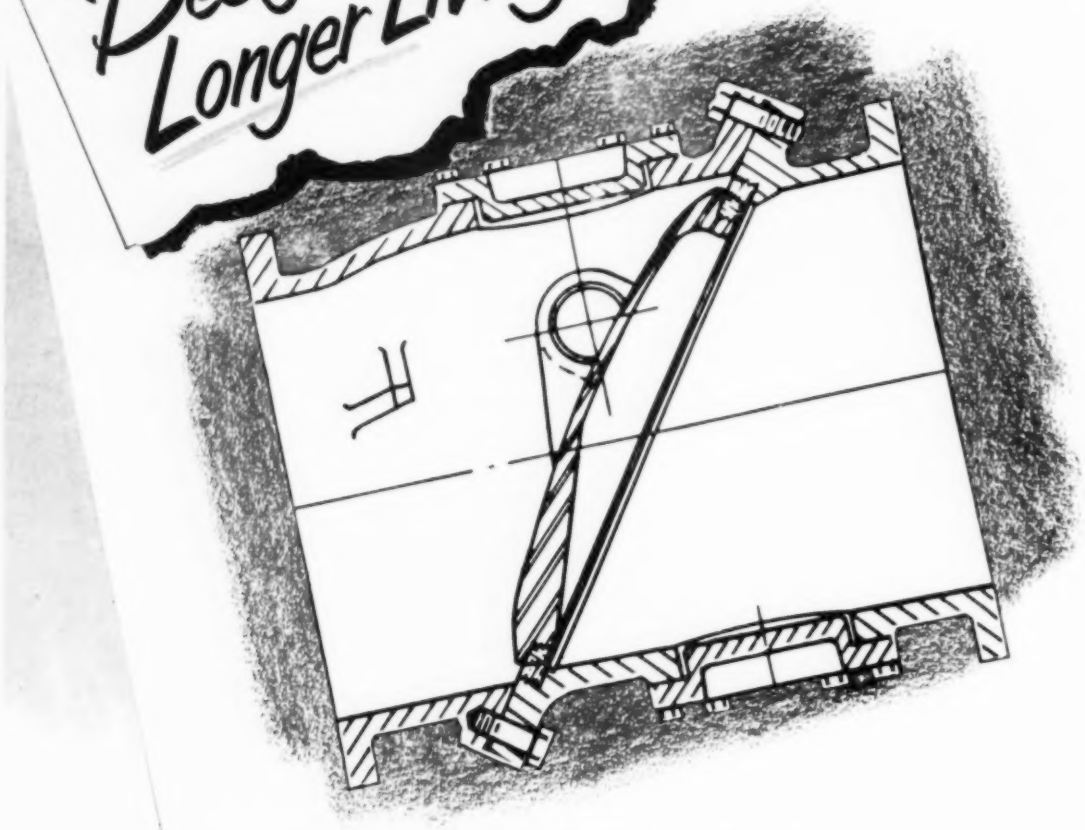
ASSURES SATISFACTORY PERFORMANCE—When you rely on Link-Belt as a single source for your complete system, we accept responsibility for placing it in full operating readiness. We will also supervise modernization of existing systems. For all the facts call your nearby Link-Belt sales representative.

LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 13,466-B

Design for Longer Living



. . . You find it only in

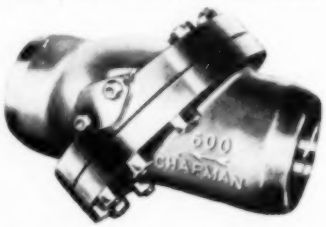
CHAPMAN'S
Tilting Disc CHECK VALVE

Here you can see the specially designed *airfoil section* of the disc in the Chapman Tilting Disc Check Valve . . . and you can see how the disc-seat lifts away from the body seat when opening (and drops into contact when closing) with no *sliding or wearing of the seats.*

Under usual piping arrangements this unique designed disc won't slam . . . just cushions itself to a quiet closing that does not even jar the line.

And this balancing is the reason why Chapman Tilting Disc Check Valves greatly reduce head-loss over standard designed swing-type checks . . . as proven by tests in leading engineering schools and by actual performance in the field.

Available in iron or steel. Complete test data is given in Catalog No. 30–write for your copy now.



The Chapman Valve Mfg. Co.
INDIAN ORCHARD, MASSACHUSETTS

TIMELY COMMENTS

Keep No Worthless Records

NO LONGER do plant operators "have time on their hands." Modern plants demand skilled attendants—and that means higher salaries. Consequently management is providing more automatic controls, more instruments, and more material handling equipment to allow each man to contribute more to the operation. Proportionately, we have fewer apprentices, fewer extra operators—and practically no nail kegs to sit on. There is plenty of work to occupy all the men the payroll will stand. And yet we see here and there needless work being done day after day.

Worthless, meaningless records (some originated years ago) are still being compiled and stacked in cluttered files. This, in spite of the fact that most modern instruments are completely recording, and automatically provide a better record than can be set down on the log sheet. Much of the wasted time could be well used in interpreting the results of these instruments and keeping them in proper repair. Also filing the instrument charts to facilitate quick back-checks is becoming more important each day.

Certainly we still need log sheets, but they should be designed to supplement and coordinate the chart data, rather than merely repeat it. Nearly all log sheets that were designed a few years ago need revising. Thorough study will not only eliminate unnecessary work but a newer and simpler form can usually be made to give better, more usable information.

Because of variation in quantity of materials in flow, many short-period calculations are meaningless anyway, and control checks may be much more accurate if made on a weekly basis rather than daily. Consequently hourly operation can best be based on close observation of recording instruments; and overall studies and procedure improvements are normally dependent upon interpretation of weekly or monthly results.

Since no two plants are identical, no rule-of-thumb for handling data and records can be set down. There are, however, some general principles of record keeping that apply to every operation:

1—Purchase each instrument for a specific purpose. If you don't need it, don't buy it.

2—Once a certain instrument or control is found to be desirable, buy the best product available for the purpose.

3—Key the instrument maintenance program to the number and type of instruments in the plant. Cull all worthless instruments and keep the remaining ones operating accurately.

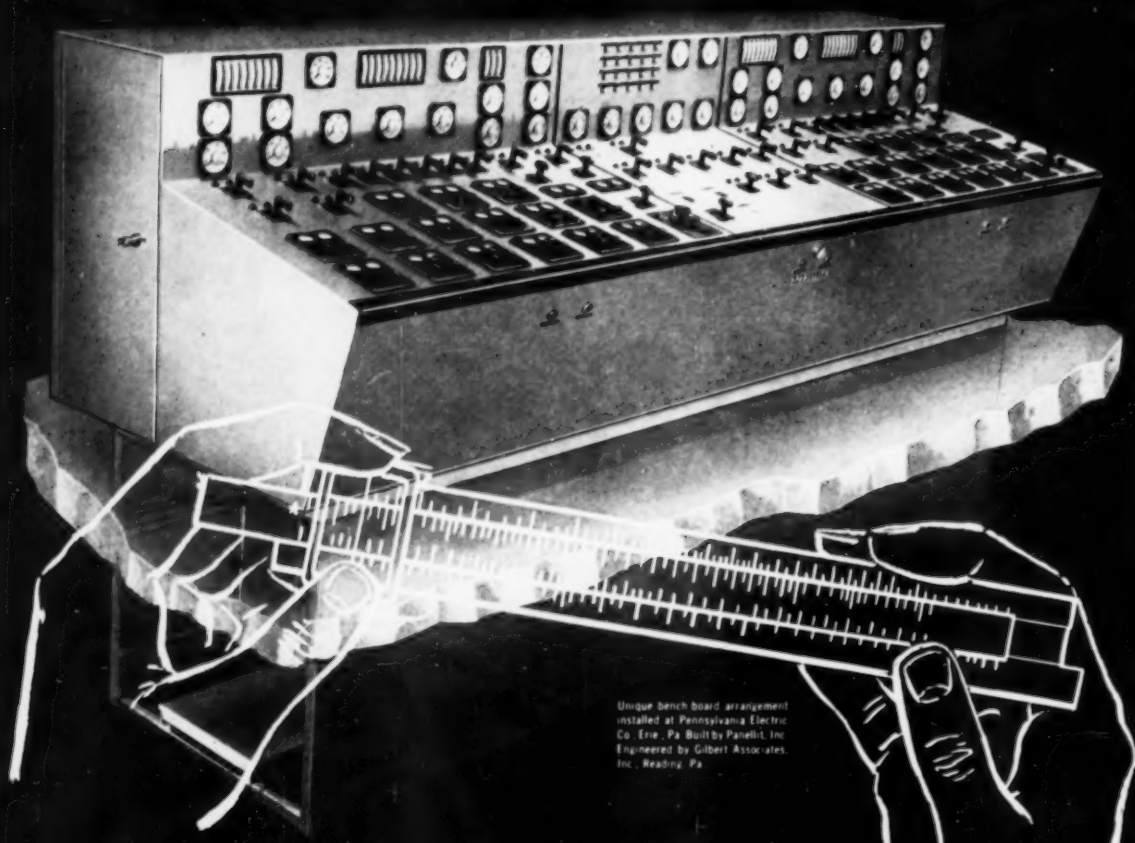
4—Establish a chart filing system that will work. Develop a system whereby back records will be quickly available. No busy operator can be expected to plow through disorganized stacks of charts to make a necessary comparison.

5—See that no important records are lost. Make it a "criminal offense" to disfigure or fail to return charts to the file.

6—Charts have one serious weakness—they do not give data in duplicate. Therefore every plant should have means for duplicating charts when needed for reports and special studies.

7—Safeguard against carrying errors forward. Once an instrument is found to be in error and is recalibrated, all faulty past records should be so marked. And any accumulative data going into yearly totals should be corrected at once, and date of correction indicated.

Now in closing we must mention one more item that may seem extraneous after so much discussion of instruments and charts. No modern plant can afford to be without a good camera and a man that knows how to operate it. Particularly in maintenance, there is nothing that will take the place of good pictures to show progressive deterioration, and results of improvements. Here too filing is important. Duplicate prints are cheap, so the film should be filed and preserved for future needs.



Unique bench board arrangement installed at Pennsylvania Electric Co., Erie, Pa. Built by Panellit, Inc. Engineered by Gilbert Associates, Inc., Reading, Pa.

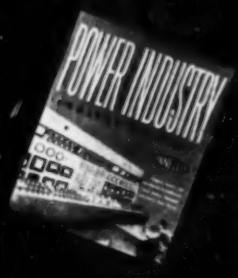
putting imagination to the rule...

Practical, new ideas in control systems are making the operation of power generating stations and sub-stations easier . . . better . . . more economical . . . and more dependable today.

Many recent, outstanding installations in the power field have been built by PANELLIT . . . and reflect the *imaginative engineering* of the PANELLIT organization.

PANELLIT builds only control systems and panelboards. It does not manufacture instruments or controls, thus its engineering assistance and equipment recommendations are always independent of sales considerations.

PANELLIT maintains a separate Power Division in its Engineering Department, as well as divisions for other specialized fields of application. It is this complete understanding of our business and your application that has enabled PANELLIT to establish new standards in power and process industry instrumentation.



NEW LITERATURE entitled "POWER INDUSTRY CONTROL SYSTEMS" will gladly be sent to you upon request. Ask for Bulletin 3010.

PANELLIT

. . . engineers and builders of control systems, panelboards and Panelgraphs

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PANELLIT, INC. 6312 NORTH BROADWAY CHICAGO 40, ILLINOIS

INDUSTRY SPEAKS

SOUTHERN POWER AND INDUSTRY

Southern Progress—Opportunities and Obligations

With Governor Talmadge on his recent trip to New York in the interest of new business and industry for Georgia were members of the Georgia Ports Authority. Left to right, front row, are: Tom Talmadge, Georgia Ports Authority representative; Peter Roe Nugent, member of the Authority; Governor Talmadge, William R. Bowdoin, chairman of Authority; D. Leon Williams, director of Authority; second row, M. M. Monroe, member of the Authority; Taxi Smith, secretary; John Vandegriff and Jack Tumlin, representatives.

Abstracted from an address of Governor **HERMAN E. TALMADGE**, of Georgia, before the Forum Luncheon of the **Traffic Club** of New York. The club president, J. P. Dennis, of the **Texas Company**, estimated an audience of 600 persons. The Traffic Club has 1600 members who are either industrial traffic managers or representatives of rail, air, truck and steamship lines.

OUR PEOPLE are united as never before and are working tirelessly at the task of promoting job opportunities and a better living for all. As a result, Georgia and her sister states of the South are advancing at a faster rate than those in any other region.

We are diversifying our agriculture and balancing it with sound industry. Our doors are open wide to capital and labor so long as they come to join in full partnership in our development. We are extending a cordial welcome to this new Southward march.

Georgia led the entire South in industrial development last year with 270 new or expanded plants each representing an initial investment of more than $50,000. These plants, for the most part, are locating in the smaller cities and towns, many of which previously had no industry.

Our nation is now engaged in the greatest struggle of our history. It is a clash of ideas and fundamental philosophies. The test is whether this nation and its republican form of government, guaranteeing freedom for all its people, shall survive—or whether the entire world shall fall victim to the godless dictatorship epitomized by the one word, communism.

Already eight hundred million of the world's people, occupying one-fourth of the land area of the earth, have fallen under the yoke of red oppression.

The apostles of satanism who sit distrustingly in the Kremlin have no soul, no conscience and no God. They have one ruthless and uncompromising aim—the domination and enslavement of the whole world, including your fireside and mine.

No man who believes in freedom will be safe if our country falls victim to this menace. But there are certain positive steps which we can take to assure our future as a free and prosperous people:

We must launch a bipartisan crusade to destroy communism wherever it seeks to infiltrate into our government and nation. We must proceed without character assassination, headline-hunting, petty bickering or circumvention of basic liberties.

We must unite in strength and understanding with the resolve to assert ourselves in the international struggle with whatever force necessary to preserve our country and our way of life.

We must return to the Old American way of placing first things first.

We must define and limit federal areas of taxation and give immediate tax relief to the individual taxpayer and business alike.

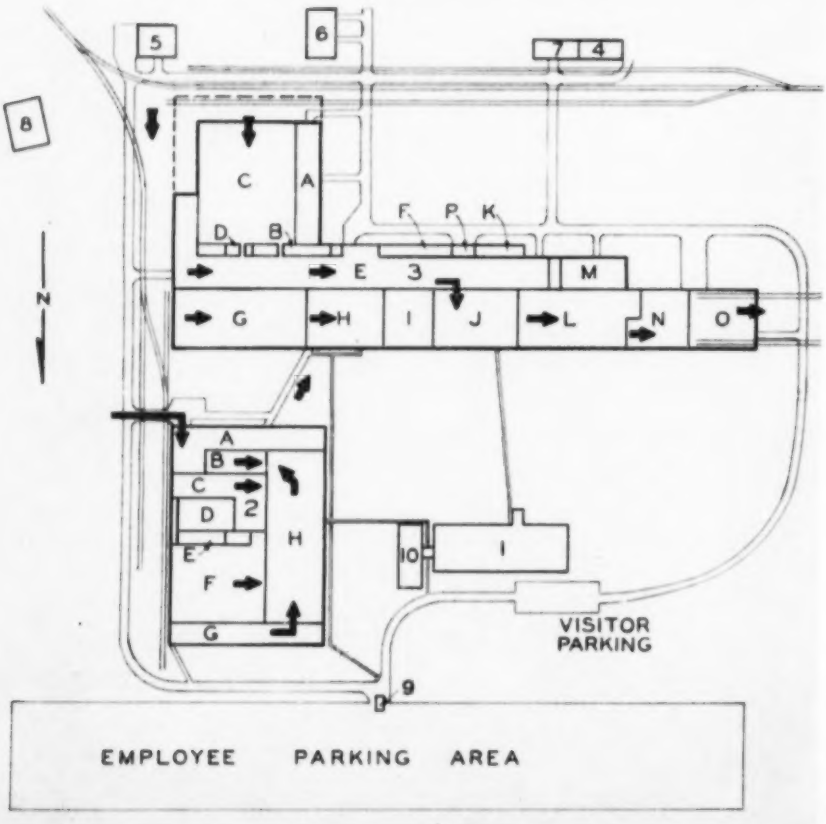
We must eliminate federal bureaucracy and return government to the local level.

We must reaffirm the authority of the individual states to manage their own internal affairs without outside interference.

We must adopt a sound, realistic federal budget predicated first upon filling our own peoples' needs and strengthening the fiber of our country.

We must give ourselves to a nationwide resurgence of faith in Almighty God: a faith which is the only source of lasting strength and power and a faith without which no country can be builded or can long endure.

Rome, Georgia—New $25,000,000 Transformer Plant has safe, efficient, flexible distribution system



1. **Office Building**

2. **Coil Winding Building**
   - A. Receiving & Stores
   - B. Woodworking
   - C. Cable & Copper
   - D. Laboratory
   - E. Office
   - F. Insulation
   - G. Wire
   - H. Winding

3. **Tank & Assembly Building**
   - A. Maintenance
   - B. Tool Grinding
   - C. Tank Shop—Low Bay
   - D. Tank Shop Office
   - E. Tank Shop—High Bay
   - F. Tank Shop Office—General
   - G. Core
   - H. Assembly
   - I. Treat
   - J. Tanking
   - K. Assembly Office—General
   - L. Test
   - M. Motor-Generator Room
   - N. Finishing
   - O. Shipping
   - P. Garage

4. **Scrap & Salvage Building**
5. **Gas Generating Building**
6. **Boiler House**
7. **Oil Processing Building**
8. **Spray Pond**
9. **Plant Protection Building**
10. **Cafeteria**

G.E. Takes Its Own Prescription

By HENRY HEDDESHEIMER

Supervisor of Manufacturing Facilities
General Electric Company, Rome, Georgia

PRESCRIPTION — Load-center distribution . . unit substations . . flexible circuit arrangement . . higher voltages . . interlocked armored cable and plug-in bus-way . . capacitors . . and combined power and lighting circuits.

THE old expression, "You made it! Now use it!" applies to nearly every detail of the *electrical distribution system* in the new transformer manufacturing plant of General Electric Company at Rome, Georgia. G.E.'s *Guide to Modern Plant Electric Power Distribution Practices* prescribes specific methods that will help maintain power continuity, reduce installation and operating costs, and safeguard personnel and equipment. At Rome, we followed these recommendations exactly in the design and application of equipment.

The general plan of production facilities was directed by General Electric engineering specialists, based on wide experience in their other plants. Robert and Company of Atlanta, Georgia, served as design engineers, and construction was handled principally by Georgia firms.

Mr. D. B. Lawton, manager of the plant, likes to emphasize that, "this is an important element in G.E.'s entire national program. The company will make nearly all of its medium capacity (501 to 10,000 kva) transformers in the Rome plant, and they will be shipped to all parts of the world—not merely to customers in the Southeast.

"The site was selected because of sound business reasons that indicate its advantages as a production center for heavy electrical equipment. And while it will lower freight costs to nearby areas, concentration of this type of manufacturing at one point is planned to speed delivery and improve service to all of its customers."

Building Design

The two production buildings are single story and together form a T-shaped structure. Its longest dimension is 1200 ft, and both the site and design provide for almost unlimited expansion. The principal office and engineering forces are housed in a separate building, but office space is also provided in the plant to meet departmental requirements. All offices and the cafeteria are completely air conditioned.

Equipment is arranged to place manufacturing on a semi-assembly line basis, and extensive use is made of automatic controls and material handling equipment. But even with this most modern equipment, the working force will include approximately 1700 people. With the exception of key personnel and training supervisors, most of the employees are from Rome and the surrounding farms and villages.

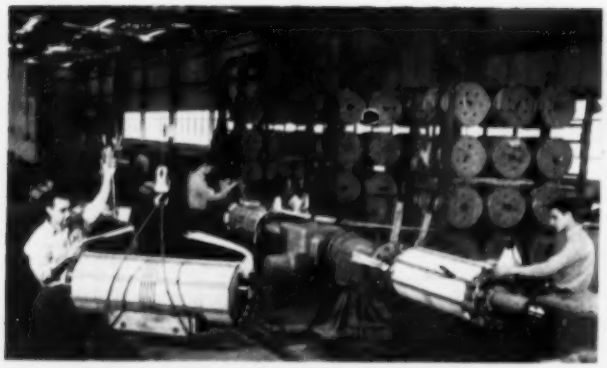
HENRY E. HEDDESHEIMER, JR., Supervisor of Plant Facilities at the Rome, Ga., Medium Transformer Plant of General Electric, joined the company in 1946 at Pittsfield, Mass. He was graduated from Virginia Polytechnic Institute and spent three years with the Army Engineers in Belgium and the Philippine Islands. He was named plant engineer for the Rome plant in 1952 and transferred to Rome early that year, before the plant was constructed.

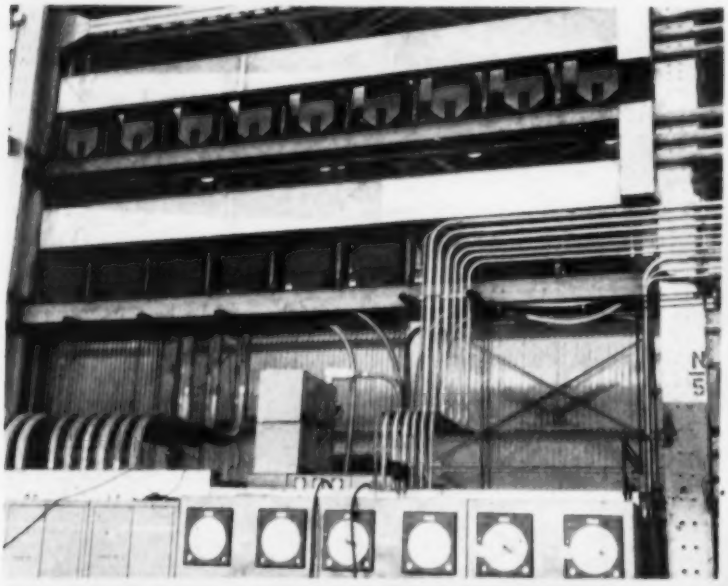
ROME PLANT PERSONNEL

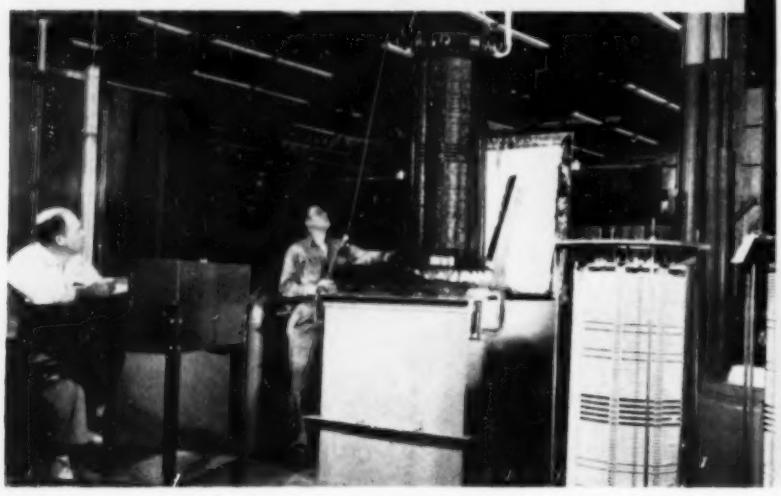
David B. Lawton, Manager
T. F. Volkmer, Manager of Engineering
D. Hopley, Manager of Manufacturing
Henry Heddesheimer, Supervisor of Manufacturing Facilities
Coke Vann, Mechanical Engineering Specialist
A. F. Schlotterer, Electrical Engineering Specialist
C. A. Hovey, Foreman of Boiler Plant, Scrap Dept. and Gas Dept.
F. W. Pope, Foreman of Mechanical Maintenance
H. Haskell, Foreman of Electrical Maintenance

Arrows on the accompanying diagram of the manufacturing area show how materials and components move through the various steps—ending with finished transformers that are shipped direct to customers.

While the handling equipment is elaborate, it is not complicated. In the early steps of assembly, components manufactured in the various departments meet on a central assembly line belt conveyor—supplemented in some sections by dollies which are advanced down the aisles by under-floor drag chains. Further on, as the transformers take shape and become heavier, they are handled by an extensive system of overhead cranes—the largest 30 tons capacity. In fact, practically every point in the manufacturing area can be reached by one or more bridge cranes that travel on rails sup-







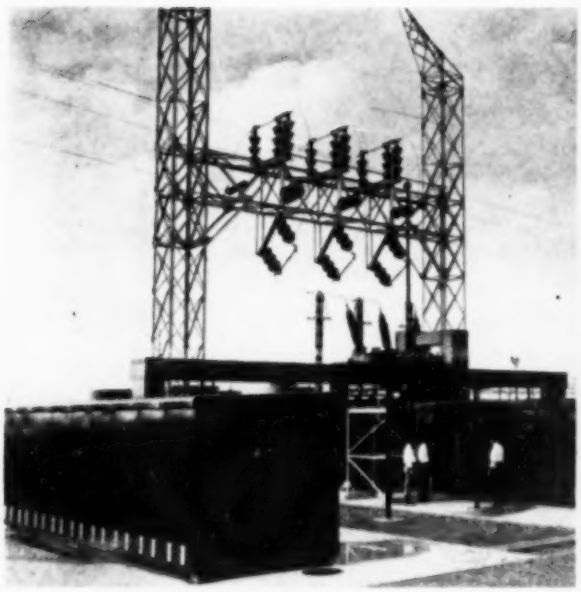
TOP LEFT—Transformer coil winding operation. Finished coil is being loaded on conveyor to move to coil treating area.

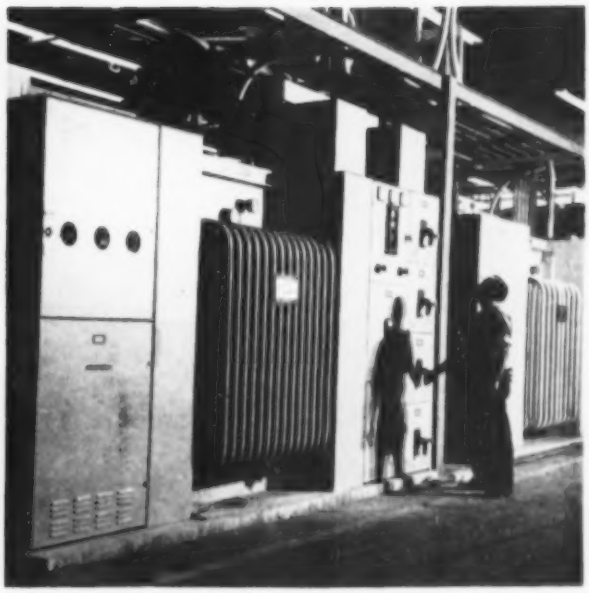
TOP RIGHT—
Low-bay type lighting.

CENTER—Control equipment for 10 ton silicon-steel annealing furnaces. 480-220 volt type D transformers supply power to each heating section of furnace.

BOTTOM LEFT—Transformer coil being varnish dipped to bond conductors and insulation for increased strength.

BOTTOM RIGHT—"Windmill" fixture for assembling cooling tubes. Operators can rotate fixture end over end so that they continue to do "downhand," high quality, faster welding.





MAIN SUBSTATION (left) showing incoming lines, power transformers and feeder breakers. Typical 750 kva load center, 13,800 volt—480/277Y, is shown at the right. There are 19 similar installations throughout the plant.

ported by the building columns. This equipment may be seen in some of the photographs.

Utilities

Steam for heating and process is supplied by three 30,000 lb capacity, 220 lb pressure boilers. They are gas fired, with oil standby.

Water is purchased from the city of Rome and much of that used in process is recirculated through a 700,000 gallon spray pond. The elevated surge tank has a capacity of 150,000 gallons, and contains a 100,000 gallon reserve compartment for fire protection.

A gas producer station generates hydrogen, oxygen and nitrogen. Oxygen and hydrogen are used for flame cutting of steel plate, and nitrogen is employed as a purge gas for hydrogen, which is used as a protective atmosphere in annealing furnaces.

Two 2500 cfm air compressors supply the extensive needs for compressed air (blast cleaning, paint spraying, etc.) throughout the plant.

All power is purchased from Georgia Power Company. When their new power plant in the same vicinity is completed, another supply source will provide excellent protection against high-line interruptions.

Because fuel gas is important, for some gas fired ovens and the production gas generating station, a reserve propane gas station is provided. The propane storage equals about three months' needs.

POWER DISTRIBUTION

Purchased power enters G.E.'s property at 110,000 volts, and after being reduced to 13,800 volts in the main substation, goes through underground cables to nineteen unit substations, located at appropriate load centers in various sections of the plant. At the load centers, voltage is reduced to 480/277 volts, to serve both power and lighting loads.

Power factor is maintained at satisfactory level through use of synchronous motors on the largest loads, and capacitors at each unit substation. Voltage drop is minimized by high power factor and relatively short runs. No voltage regulators are needed; however low impedance transformers are used in the welding department. All motors are arranged for across-the-line starting.

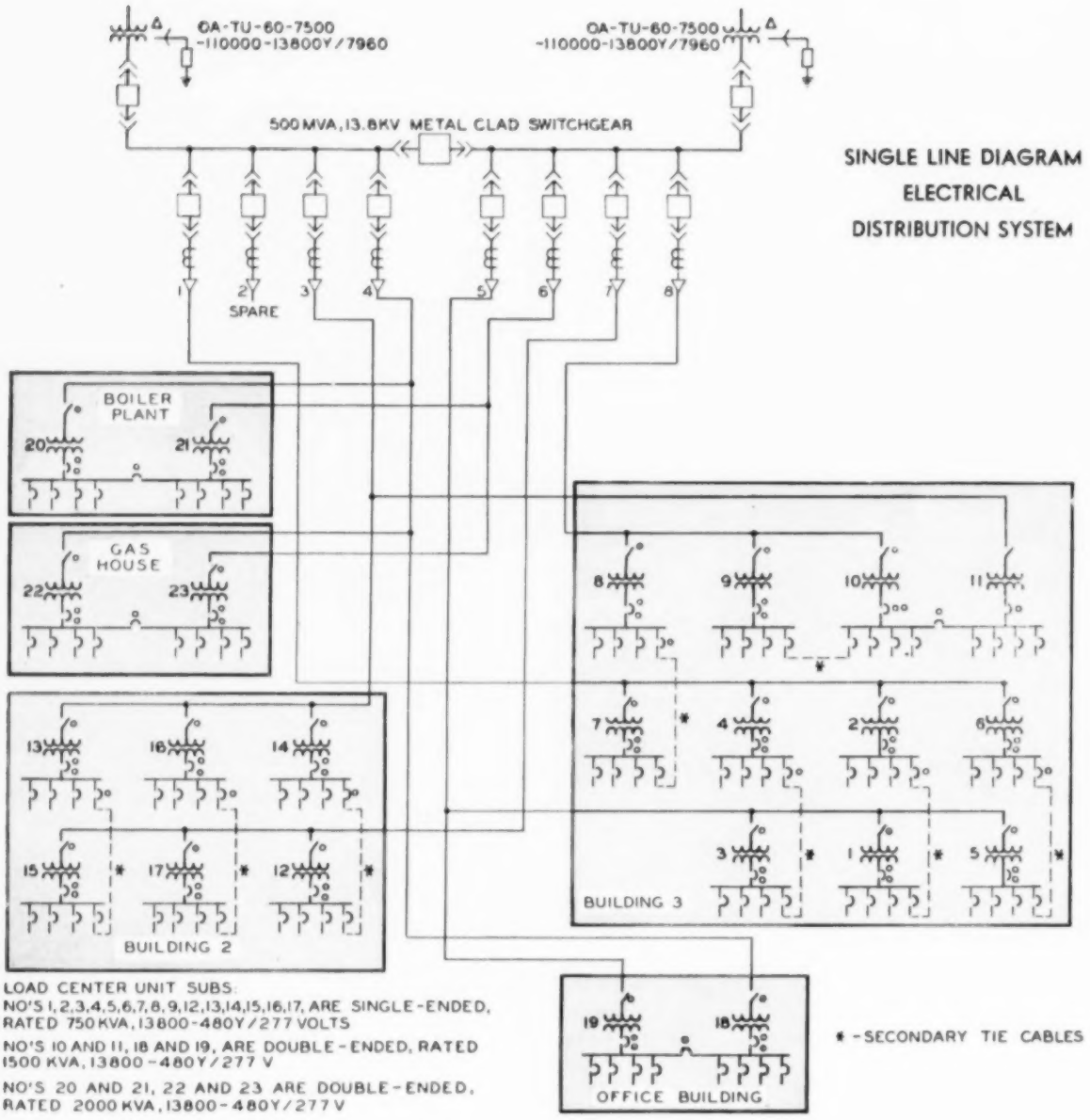
Choice of relatively high distribution voltage, and the 480Y/277 volt, four wire, combined power and lighting circuits result in: (1) Lower installation cost, (2) a system that can be easily expanded, (3) less hazardous operation, and (4) excellent flexibility.

Use of smaller conductors, made possible by the higher voltages resulted in substantial copper savings, and since areas are readily de-energized for maintenance work, hazards are reduced. The system also simplifies rearrangement and expansion problems.

Main Substation

Two power transformers are fed from the power company loop (see single line diagram). These main transformers are self-cooled, 3 phase, 7500 kw, 110/13.8 kv units, with the secondary Y-connected and the neutrals grounded through current limiting resistors. Power at 13,800 volts leaves the transformers through two lines of outdoor, unit type breakers, with four feeders leaving each line. Each line of breakers is supplied independently from one transformer and protected by a main breaker, but they may be connected at the center through a tie breaker; thus load is normally distributed between the two transformers, but switching is available to place all load on one transformer.

Power is distributed from the main substation to the unit substations through 3-conductor, VCL cable, run underground to potheads


OA-TU-60-7500
-110000-13800Y/7960
OA-TU-60-7500
-110000-13800Y/7960
500 MVA, 13.8KV METAL CLAD SWITCHGEAR
SPARE
BOILER PLANT
GAS HOUSE
BUILDING 2
BUILDING 3
OFFICE BUILDING
LOAD CENTER UNIT SUBS:
NO'S 1,2,3,4,5,6,7,8,9,12,13,14,15,16,17, ARE SINGLE-ENDED, RATED 750 KVA, 13800-480Y/277 VOLTS
NO'S 10 AND 11, 18 AND 19, ARE DOUBLE-ENDED, RATED 1500 KVA, 13800-480Y/277 V
NO'S 20 AND 21, 22 AND 23 ARE DOUBLE-ENDED, RATED 2000 KVA, 13800-480Y/277 V
* - SECONDARY TIE CABLES

SINGLE LINE DIAGRAM ELECTRICAL DISTRIBUTION SYSTEM

at each building entrance. Conduit carries shielded VC cable overhead to the unit substations.

Unit Substations

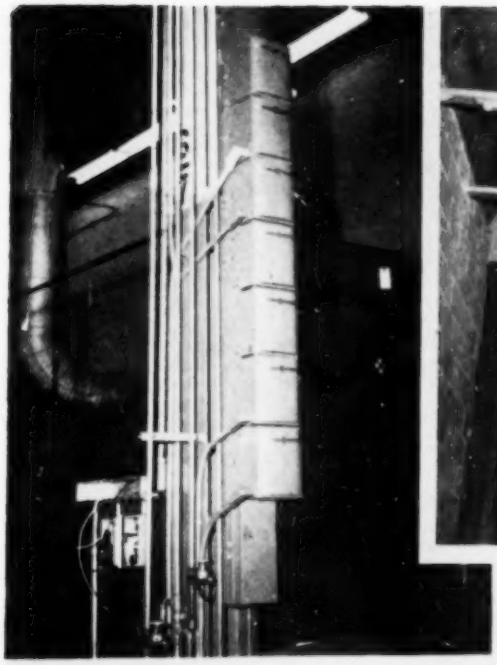
There are nineteen load-center unit substations, all located within the factory buildings except one at the boiler plant and one serving the main office and cafeteria. All load centers are provided with low voltage ties to other centers. Thus, use of low voltage circuits may continue, even in the event of loss of power through a unit substation.

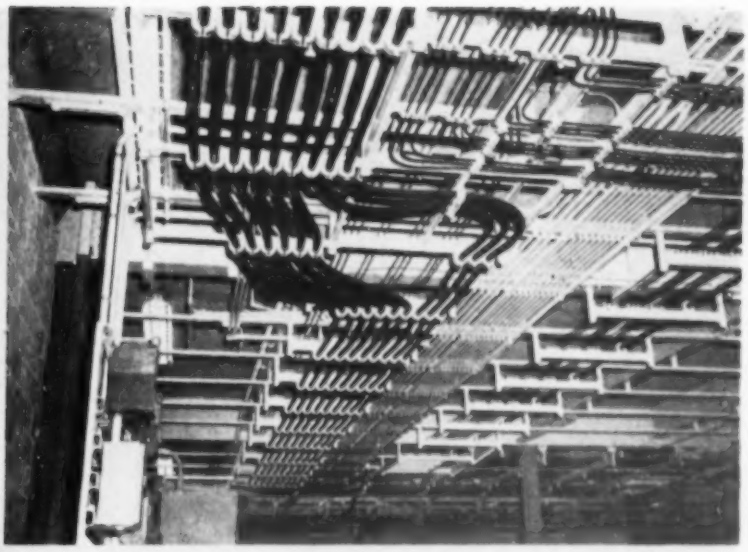
There are only two sizes of load center transformers, 750 and 1000 kva. Consequently, maintenance needs are minimized. All are rated 13,800-480Y/277 and the neutral is solidly grounded. Four of the load centers are double ended to supply large concentrated loads in the office building, the gas house, the boiler plant, and in one section of Building 3. (See diagram.) Because demand charge is on a kva basis, all load centers are provided with capacitor banks to maintain high power factor.

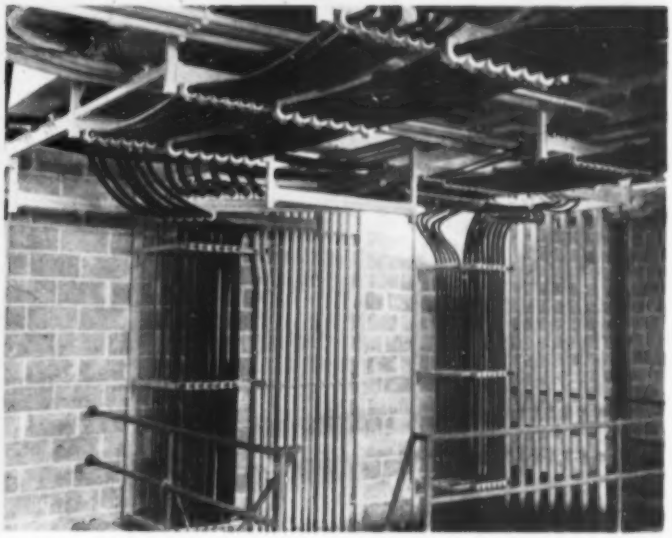
Feeder Circuits

Power and lighting load are fed through Interlocked Armor Cable. Three 500 MCM conductors for power and three No. 4 ground conductors in the voids formed by the larger conductors, comprise each armored cable.

Trumbull 400 ampere Flex-A-Power bus duct, vertically mounted on the building columns is connected to the cable, and provides tap-offs through Trumbull plug-in switches. (See photograph.) The top section of the bus duct is 4-conductor to permit connecting 4-pole plug switches for 277 volt (line to neutral) lighting. The lower section of the same duct







TOP LEFT—Flex-A-Power* plug-in busway, mounted vertically throughout the plant on steel columns, affords maximum flexibility in machine arrangement without the cost of rewiring every time a department layout is changed.

BOTTOM LEFT—Power cables entering tunnel for distribution to various test berths are mounted on Unistrut framing, assembled by the nut and bolt method.

TOP RIGHT—Power wiring from motor-generator sets to final test area. The power required to test the transformers is supplied by 16 motor generator sets with amplydine control.

BOTTOM RIGHT—Section of tunnel beneath final test. Power cables, control wires (in conduit) and oil and Pyranol* piping may be seen. Single line diagram of the plant's distribution system is on opposite page.

provides 3 phase, 480 volt power to motors.

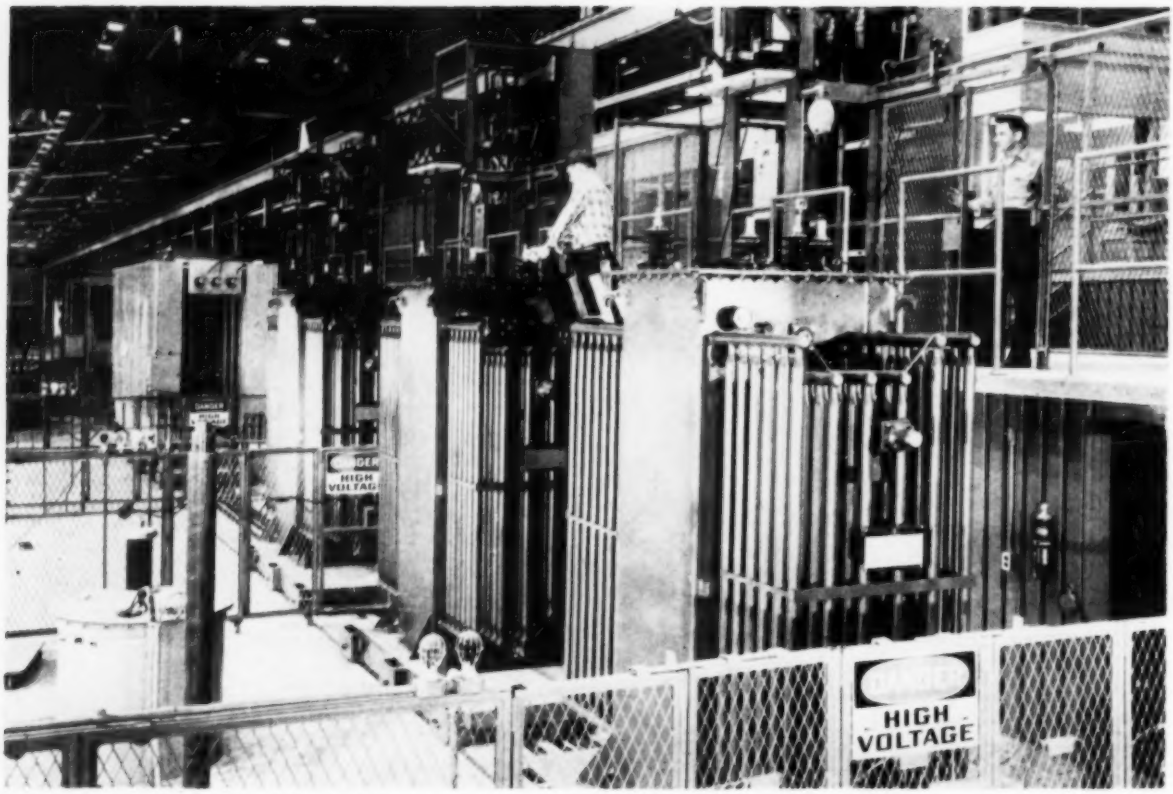
The Trumbull Type HCI plug-in switches are provided with G-E, EJ-6 current limiting fuses. Since these fuses have sufficient interrupting capacity, wall type circuit breakers are omitted. Additions and relocation of equipment are facilitated because both the plug-in switches and fuses are available in a number of ratings. Single-phase outlets provide 240 and 120 volt service on alternate columns of the building.

Another feature that greatly facilitates changes in electrical equipment location is the wood-block flooring installed throughout the plant. New in-floor circuits can readily be accommodated by lifting rows of blocks or sawing diagonal grooves in the blocks. After the circuits are installed the floor grooves are merely filled with asphalt.

Lighting

Office and low-bay factory lighting is provided by 8 ft fluorescent fixtures mounted in continuous lines, and operated at 277 volts. As previously mentioned the lighting is connected line-to-neutral on the same circuits that supply

* Reg. Trade Mark of General Electric Co.



COMPLETED TRANSFORMER is given its final series of tests to insure conformance to customer's specifications. Tests given are: Resistance, Core Loss, Ratio, Impedance, Heat Run, Impulse, Hi Potential and Induced Voltage.

power at 480 volts connected line-to-line. Load balance is maintained on all three phases.

Factory and office fluorescent lighting units are essentially alike, except with regard to spacing, and method of control. Fifty foot-candles are provided at office desk level, and 35 foot-candles in the factory. Reflectors are slotted to give 40% up-lighting in the office and 10% in the factory.

Control of the office lighting is of the conventional instant-start type, but the cascade system is employed in the factory.

Each section of the factory building has only one pushbutton for turning on or off all lights in that section. Pushing the button energizes a contactor for one group of lights, and an auxiliary contact on the first contactor energizes an adjacent group—and so on (cascading) until all lights in that section are energized. Control of all lights in one section by one button greatly simplifies wiring, and reduces installation cost.

High-bay factory lighting is quite different from the low-bay system just described. Here, an alternately staggered combination of mercury vapor lamps and incandescent lamps is employed. Mixing the two, modifies the blue light given by mercury vapor alone. And the instant lighting characteristic of the incandescents gives some light immediately when the system is first turned on. This is a decided advantage because it takes mercury vapor lamps 8 minutes to reach maximum brilliance, and in event of power failure the mercury lamps would have to cool 5 minutes before restarting.

The mercury vapor lamps are supplied 277 volt energy in the same manner as the fluorescent system previously described. The 1000 watt incandescent lamps, however, are supplied 120 volts in groups of three. Each group is supplied by a 3 kva, 480-220/120 volt, type M transformer. The primary is supplied by the same drop that feeds the mercury vapor lamps, and control is by cascade contactors.

This article has presented merely a general account of the principal electrical distribution features, and details have necessarily been omitted. It is hoped, however, that the five basic principles have been illustrated, and their advantages clarified. These are: Use of unit substations at load centers, operation at relatively high voltage, combination of lighting and power circuits, provision of necessary power factor improvement equipment, and load supply from bus duct through fused Trumbull plugs.

Results of these design trends are: savings in copper, reduction of voltage drop, flexibility with regard to expansion and maintenance, and few outages and hazards. The plant is not yet fully completed and equipment has only been in operation a few months. But, preliminary experience indicates that G. E. engineers were right in their decisions on design.

Versatile Fork Trucks *ON-THE-GO*

Jefferson, Missouri—By using a gravel scoop on a fork truck, Mid-West Block Company has been able to handle thousands of pounds of sand and gravel and speed up block production.

Company uses a 2000 lb capacity gas-driven Clark fork truck for all handling needs in production. Raw materials for the block machines are handled with the gravel scoop. Forks replace the scoop for handling finished blocks.

St. Louis, Missouri—The Laclede-Christy Company, producing refractory products such as fireclay brick, high alumina brick and acid-resisting brick, as well as sewer pipe, operates a fleet of 14 Towmotor fork lift trucks. They perform a wide range of duties—unloading of ware from kilns to loading in railroad cars and for shipment by trucks.

About 75% of the shipments are palletized, after which they are wrapped in corrugated board and bound to the pallet with steel strapping. Unit load can be handled far more easily and more quickly at both ends of the journey.

Baton Rouge, Louisiana—Modern methods involving two Towmotor fork lift trucks have enabled the Copolymer Corporation to reduce by half the number of men formerly required to transport "bales" of synthetic rubber from the wrapping room to highway trucks or railroad cars.

Bales weigh 75 lb each and are fed into a packaging machine which wraps them in transparent film. Bales are packed in corrugated boxes, 33 to the carton, and weigh 2,475 lb. Loads do not have to be palletized, as each truck is equipped with a special unloading device.

Raleigh Reactor—Another Southern First

By JOHN F. LEE*
Consultant on Atomics
for Southern Power & Industry

Research at North Carolina State College will help South continue its important role in expanding nuclear industries.

THE NATION'S first privately owned nuclear reactor went into operation last September on the campus of North Carolina State College. This was the first operation of a nuclear reactor under private control. It also marked the first time a reactor was built exclusively for peacetime development of atomic energy. Furthermore, initial operation of the Raleigh reactor was the first removal of this procedure from under the cloak of secrecy.

The national significance of these events rests in the fact that they heralded the initial phase in the transfer of responsibility for the peaceful development of nuclear science and engineering from governmental to private hands. The nation's interest in the Raleigh reactor has been clearly demonstrated in numerous newspaper and magazine announcements all over the country.

The Raleigh reactor represents a significant achievement for the South. In many respects it typifies the South's emergence from a creditor status in the field of technological education and research. Equally important, it demonstrates that there exists in the South the technological leadership and foresight which should be expected of a region that claims a large share of the country's new industrial growth.

As a research tool, the Raleigh reactor will provide for explorations into the problems related to the use of nuclear energy for the production of power and the discovery of new uses for radiations in the chemical, biological, medical, and agricultural sciences. These researches should enable the South to assume an important role in the new, but rapidly expanding, nuclear industries. Perhaps the greatest contribution which the reactor facilities can make to the South is in the training of nuclear engineers and scientists upon whom the future development of the industrial uses of atomic energy depends.

Purpose of Reactors

The basic purpose of any reactor is to provide for the self-sustained and *controlled* fission of the nuclei of the atoms of certain elements. Fission takes place with a release of heat and radiation. Thus, in effect, the energy inherent in a given quantity of nuclear fuel is released in a reactor at predetermined rates over an extended period of time. If the nuclear reaction were uncontrolled the same total quantity of energy would be released in a short interval of time. The result would be an atomic explosion. Thus a nuclear reactor permits the regulated release of energy in much

*Mr. Lee is associate professor of Mechanical Engineering, North Carolina State College.

AEC Plans Several New Reactors for

THE ATOMIC ENERGY Commission spokesmen have announced plans for the construction of several new types of reactors in the very near future. These reactors will be designed for the purpose of power generation and will be in addition to the 60 000 kw reactor contracted by Duquesne Light Company of Pittsburgh.

Some of the proposed reactors are intended for special power purposes such as portable power plants but each type is expected to provide answers to some of the questions as to which kind of reactor is most suitable for production of power.

Dr. L. R. Hafstad, director of the division of reactor development of the Atomic Energy Commission, predicts that as a result of the present program about 10% of new electric power construction will be in atomic power plants by 1959-63. Before the end of the century, he predicts, 50% of all power plants will be atomic.

One of the proposed reactors is of the breeder type and will have a capacity of 15,000 kw of electric power. A breeder reactor is one which produces fissionable material such as Plutonium-239 or Uranium-233 as a by-product to the production of electrical energy. The fissionable material is salable and hence contributes to reducing power production costs.

A small-scale reactor of the breeder type has been operating successfully on an experimental basis at Arco, Idaho. This reactor employs a liquid metal, such as liquid sodium, as a coolant for the reactor. The liquid sodium is then used in a heat exchanger to generate steam at about 950 F and 850 psig for use in the steam turbines.

A second type of reactor to be built is the so-called homogeneous reactor using uranyl sulfate as the fuel and ordinary water as the moderator. This reactor is similiar in principle to the Raleigh Reactor at North Carolina

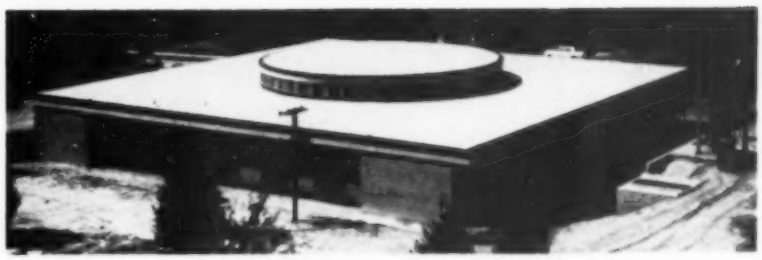
the same way that the energy in ordinary fuels is released in the furnace of a conventional steam generator.

Since the release of nuclear energy can be regulated in a reactor, this energy can be put to a useful purpose such as the generation of steam for use in a power plant. The radiations released in the reactor can be used for the irradiation of research materials and the preparation of radioisotopes for use in industry, medicine and agriculture.

The Raleigh Reactor

While meeting the obvious objective of supporting a nuclear reaction, the Raleigh reactor is designed to operate with a minimum of hazard to the operators and the surrounding area. Moreover, its sole purpose is research. Because of these requirements the Raleigh reactor is somewhat unique in its design.

The construction of the Raleigh reactor is much simpler than that of the steam generator in even the smallest power plant. The reactor core, which is the business part of the reactor, is nothing more than a stainless steel fuel cylinder having a volume of about four gallons. (see photograph with Dr. Beck on next page).



THE RALEIGH REACTOR BUILDING

The nuclear fuel consists of U-235 in a homogeneous solution with uranyl sulfate. When a critical mass of U-235 is present in the fuel cylinder with a suitable quantity of ordinary water, a self-sustained nuclear reaction takes place. Incidental to the nuclear reaction the water breaks down to hydrogen and oxygen gas and hence this type of reactor is known as a "water boiler." The intensity of reaction is controlled by raising or lowering control rods immersed in the fuel solution contained in the cylinder.

Circulating water is used to remove the heat released during reaction by means of cooling coils which are also contained in the fuel cylinder. Gases liberated as a result of the reaction are removed by a vent system and are recombined to form water which is then returned to the fuel cylinder. Finally, as a precaution against leakage the fuel cylinder is totally enclosed in a tight-fitting aluminum jacket.

If heat were the only thing released during nuclear reaction, the reactor would involve only the fuel cylinder and the related equipment described. Since radiation is also given off when nuclear reactions take place, it is necessary to provide heavy shielding against radiation.

Shielding

The shielding in the Raleigh

Atomic Power——

State College. The first step calls for the construction of a homogeneous reactor with an electrical power output of approximately 750 kw. The second step involves a reactor of about 15,000 kw of electrical output. In the 15,000 kw unit there will be a blanket of thorium surrounding the reactor core to permit breeding of Uranium-233. This reactor is expected to offer many simplifications in the way of fuel processing.

A third reactor will represent a radical departure from anything proposed heretofore. This reactor is designed to permit the generation of steam within the reactor core. Hence the heat exchanger used in the sodium-cooled breeder reactor power plant described above would be eliminated with a reduction in cost.

Most nuclear engineers have been fearful of the consequences of allowing steam to be generated within the reactor because of its adverse effects on the nuclear reactions. However it is now revealed that steam was indeed generated successfully in a reactor built for that purpose as long ago as last summer. The proposed reactor will have a capacity of 5,000 kw of electric power.

A fourth reactor with a capacity of 20,000 kw of electric power is also planned. This reactor will use a combination of graphite as a moderator and a liquid sodium-potassium alloy as the coolant. It is expected that this type of reactor will permit higher temperatures without the necessity of high pressures in the reactor itself.

A fifth reactor, announced earlier, is the pressurized-water 65,000 kw reactor to be built in Pittsburgh as part of the power generating capacity of Duquesne Light Company.

In addition to the five power reactors mentioned above there are to be a number of special-purpose power reactors. One pressurized-water reactor, similar in design to the one to be built for Duquesne Light Company, is to provide power for the submarine *Nautilus*. A sodium-cooled reactor is now under construction by General Electric Company and will be installed aboard the submarine *Sea Wolf* after the ship is launched. Another reactor will go into a third submarine. Development continues on a reactor to propel aircraft.

Still another special-purpose reactor will go into a mobile power plant producing 1500 kw of electric power. This plant will be small enough to be transported by air to such remote locations as Arctic military installations. Actually, the overall dimensions will be approximately 9 by 9 by 27 ft and it will weigh about ten tons. Although this portable atomic power plant would not be competitive in the United States it is expected that it will produce electricity at lower cost than the Diesel engines located at remote military bases.

It is believed by many industrial firms in the United States that a large market for package atomic power plants exists in many places in the world aside from military installations.

Raleigh Reactor

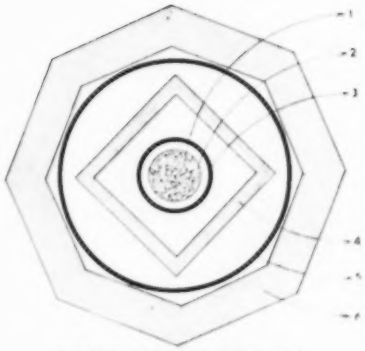
reactor takes the form of a multi-layered octagonal structure 17 ft in diameter, 12 ft high, and weighing about 226 tons.

The first layer on the inside of the shield is a 20" thick mass of graphite weighing about 13 tons. The purpose of the graphite is to reflect stray neutrons back into the fuel cylinder since they are essential in sustaining the reaction. If too many of these neutrons were permitted to escape from the reactor it would be impossible to have a self-sustaining reaction.

The next layer consists of two to four inches of lead weighing 13 tons and serves as a barrier against gamma rays, the most dangerous kind of radiation.

The outside layer is a six-foot thickness of high-density concrete weighing about 200 tons. This final layer completes the barrier against harmful radiations.

In order to have access for experimental purposes to the internal radiation present in the reactor, a number of assorted exposure tubes penetrate through the shielding to the surface of the fuel cylinder. Each of these exposure tubes is equipped with a combination-locked vault-type door to preclude unauthorized access to the reactor assembly.



SCHEMATIC DIAGRAM SHOWING SHIELDING

1—The nuclear fuel is U-235 in a homogeneous solution of uranyl sulfate, contained in a stainless steel cylinder with a suitable amount of water.
2—Stainless steel cylinder.
3—Tight fitting aluminum jacket.
4—Graphite shield, 20 inches thick.
5—Lead shield, 2 to 4 inches thick.
6—Concrete encasement 6 feet thick.

Safety and Control

A nuclear explosion in the Raleigh reactor is impossible even if deliberately attempted. In the first place the quantity of nuclear fuel is much less than the required amount for a bomb, and in fact the fuel is in a form quite unsuitable for use in a bomb. Furthermore, the reactor has a negative temperature coefficient, that is, any increase in temperature is accompanied by a *decrease* in reactivity. The maximum temperature at which the reactor operates is 176 F and the maximum power it can develop is 10 kw.

Added safety features include recording and warning radiation monitors located in the reactor building, in waste disposal systems, and at five stations on the campus within 1200 ft of the reactor building.

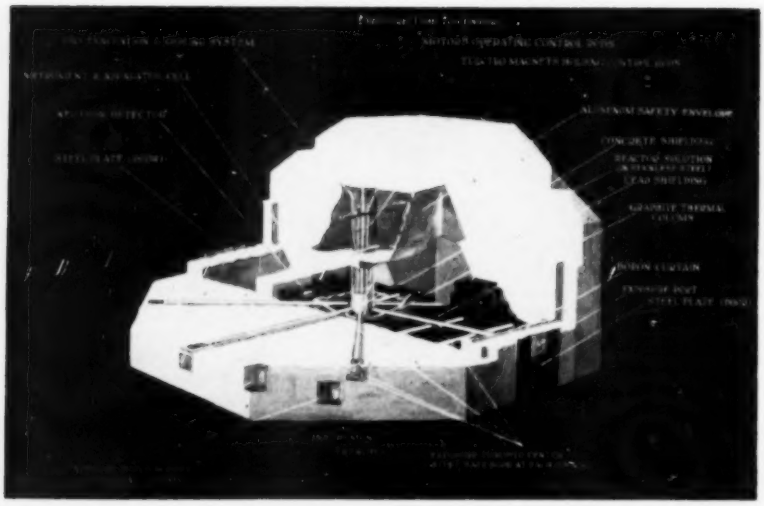
The reactor power output (within the range of zero to ten kilowatts) is controlled by means of a vertical boron control rod which is raised or lowered in a sheath tube forming an integral part of the fuel cylinder. Boron has a marked affinity for absorbing neutrons. Hence when the control rod is completely immersed in the fuel solution the maximum surface is exposed to absorb neutrons and the chain reaction stops. When the control rod is fully raised, the reaction proceeds with maximum intensity, corresponding to the maximum power of 10 kw.

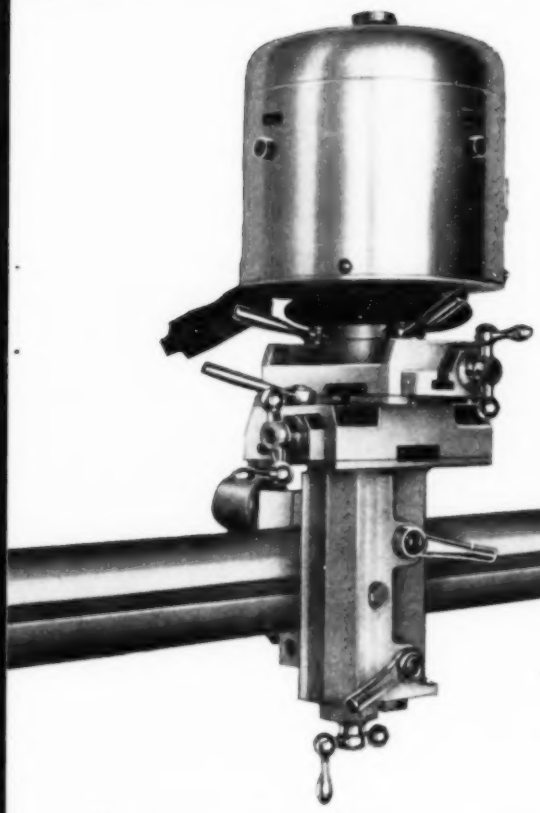
The position of the control rod may be adjusted remotely in manual operation by means of a dial located on the control panel. A more elaborate and fully automatic control system for output regulation, the operation of safety devices, and the collection of oper-

(Continued on page 86)

DR. BECK placing control rod and cooling coil assembly in fuel cylinder.

CUTAWAY VIEW OF REACTOR MODEL





Consider the low cost of model testing

. . . when critical piping is the order!

Mechanical engineers are quite familiar with the fact that today's high operating temperatures may produce severe expansion stresses and reactions in high temperature power piping systems. But the accurate determination of these by analytical methods can involve extremely complicated and tedious mathematics.

A proved means for eliminating much of the expense of this essential engineering is the Kellogg Model Tester. This device's patented electrical measuring heads (illustrated), together with its servo-operated electronic equipment, enable Kellogg engineers to make complete analyses of thermal effects including line movements . . . at low cost.

For very complicated piping systems, the model tester is the only practical method of obtaining accurate solutions. For simpler systems, it serves as a relatively inexpensive check on calculated results. Furthermore, once the permissible reactions are established for loadings at the throttle valve and the superheater header connections, the optimum design for the remainder of the system can be developed without removing the model from the tester. For analyses of less complicated piping systems, Kellogg engineers employ a modern IBM computer to reduce costs and time required to arrive at results.

Well-conceived support and anchor designs for the suspension and expansion control of all classes of lines are readily established from the information furnished by the model tester. It can also provide data to insure proper handling of the piping in the field, during welding and heat treating . . . minimizing strains, due to extraneous loadings, which might be detrimental to the production of soundly welded joints.

This approach to the problems of critical power piping—the development of new and improved methods, of less expensive methods—is Kellogg's basic stock in trade. Many power station designers and utility companies also say it's the basic reason why they repeatedly specify *"critical power piping by Kellogg."*

* * * *

NEW POWER PIPING BOOKLET . . . Send for descriptive literature about Kellogg's extensive facilities for assuring the highest quality workmanship.

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POWER PIPING

Going outdoors with power at Texas City . .

Carbide's New Steam and Power Plant

Pressurized steam generators . . inter-tube design gas burners . . pneumatic primary feedwater and combustion control . . and miniature indicators and control units.

EARLY in 1951 the engineering and construction officials of Carbide and Carbon Chemicals Company, a division of Union Carbide and Carbon Corporation formulated plans for extensive expansion at the Texas City plant. Among the items that would be needed by mid-1953 was a source of approximately 400,000 lb of steam and approximately 5,000 kw of additional power. Since the existing steam and power plant was already overloaded and provided no further space for enlargement, a new site was selected for additional facilities.

This new site is approximately one-third mile from the old generating plant. The new installation consists of two boilers and one turbine generator. The mild climate at Texas City is admirably suited for an outdoor power plant, and since most of the process units at Texas City have the major equipment outdoors, that philosophy of operation was extended to steam and power production. Manpower for the plant was established at two operators per shift.

By MAX A. LADT,

Supervisor, No. 2 Steam and Power Plant
Carbide and Carbon Chemicals Company,
A Division of Union Carbide and Carbon Corporation, Texas City, Texas

Mr. Ladt, now supervisor, No. 2 steam and power plant, Carbide and Carbon Chemicals Company, Texas City, Texas, joined Carbide in 1947, one year after receiving his M.E. degree from the Speed Scientific School of the University of Louisville. His earlier college training was at Mississippi State College.

He started his career at Carbide as a mechanical engineer in the process development department. In 1948 he transferred to the utilities department, working as test engineer and later as an assistant department head.

He has worked with the maintenance department, has been loaned out to the Louisville Carbide plant, and has worked with Union Carbide's New York engineering department. During World War II he saw duty with the Civil Engineer Corps of the Navy. Mr. Ladt is a registered professional engineer in the State of Texas.

Steam Generators

Carbide's Texas City No. 2 Steam and Power Plant boilers (numbered 21 and 22) were built by Riley Stoker Corporation. They are of 200,000 lb/hr nominal capacity each, and are the first pressurized furnace steam generators which Riley has built.

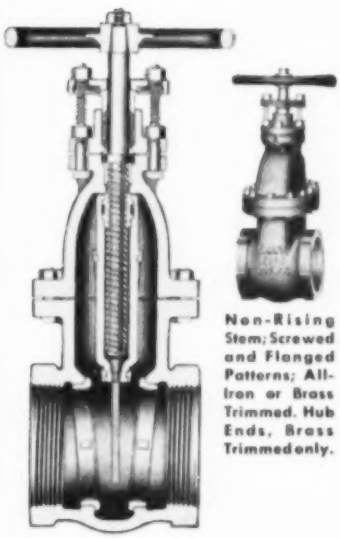
The two boilers form the east and west extremities of the unit and are opposite hand in arrangement, having all access from the bay between them. Operating pressure is 1,015 lb at superheater outlet and temperature is 850 FTT.

Superheat reduction is effected by a submerged desuperheater in the lower drum and control is derived by means of a butterfly valve in the superheater outlet header which diverts a portion of the superheated steam through the desuperheater. Each has a single turbine-driven draft fan. Cold air is discharged into a duct located below grade and terminating at the air heater. The hot air return duct is interposed between the cold air duct and the boiler floor and discharges into a burner box which is almost as wide as the furnace itself.

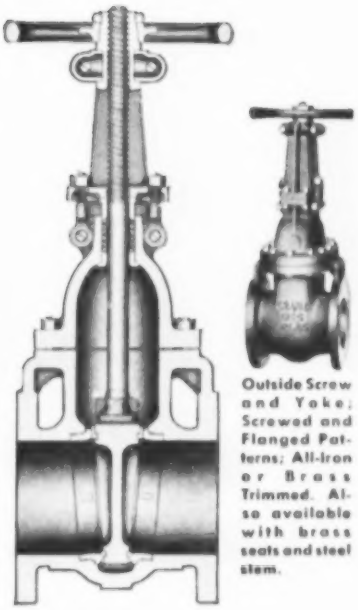
Burner Design Features

The gas burners, which supply all of the heat, are a new inter-tube design first used by Riley on these boilers. There are eight of these inter-tube burners in two

Crane 125-Pound Iron Body Wedge Gate Valves are an improved design, embodying many features of unusual merit. They set a new peak for quality in iron body wedge gate valves, having greater strength, longer life, and better all-round adaptability for all types of services.



Non-Rising Stem; Screwed and Flanged Patterns; All-Iron or Brass Trimmed. Hub Ends, Brass Trimmed only.



Outside Screw and Yoke; Screwed and Flanged Patterns; All-Iron or Brass Trimmed. Also available with brass seats and steel stem.

See If You Don't Agree!

Here's the big value — the big selection: CRANE 125-Pound Iron Body Wedge Gates

. . . with quality features that assure exactly the kind of service you want. Body and bonnet are oval-shaped with extra metal where it's needed most, to provide liberal strength. Flanged patterns have tie-ribs between body and bonnet flanges. You also get a solid web-type disc with long guides . . . a stem of liberal diameter with long thread engagement . . . an exceptionally deep stuffing box with high-grade packing . . . a two-piece ball-type gland and flange—plus an easy-to-grip handwheel with oval-shaped rim. Non-rising stem valves have a brass bushed stem collar. OS&Y design includes a brass bonnet bushing, swinging eye bolts . . . and a tee-head disc-stem connection on sizes 12-inch and smaller.

Big selection includes all-iron or brass trimmed valves . . . Underwriters' pattern valves, quick-opening types . . . valves for process industries . . . valves for marine service. Sizes up to 48-inch. Check your Crane Catalog or ask your Crane Representative next time he calls.

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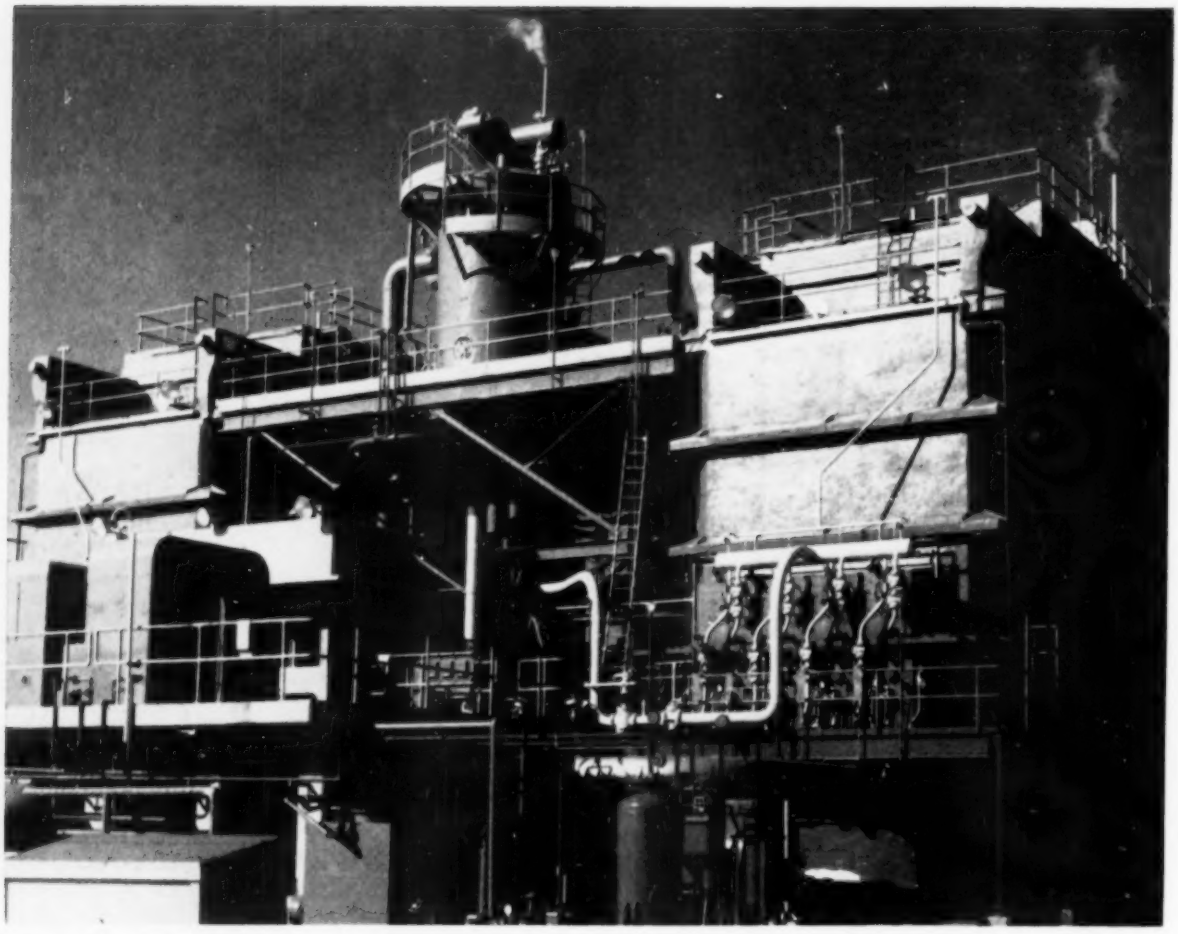

TWO PRESSURIZED BOILERS, of 200,000 lb/hr nominal capacity each, form east and west extremeties of the outdoor unit and are of opposite hand in arrangement. Power produced from the 6,250 kva turbine generator is fed to an outdoor switching station approximately 200 ft from the turbine generator pedestal. It is then distributed to a 13.8 kv-2.4 kv primary substation, which in turn feeds four 2400 v-480 v substations located from 600 to 1,200 ft away.

Photos courtesy Carbide and Carbon Chemicals Company

rows of four each. Each burner is fabricated from a piece of 3" steel tubing which lies immediately on the casing side of the front furnace wall tubes and has six 1" stainless steel tubing elements projected upward from it in the plane of the front furnace wall.

Alternate tubes in the burner wall are bent outward to allow the gas jets in the burner elements to pass through the slot thus formed. The band of flame produced by the two rows of burners is almost as wide as the furnace itself and is approximately 7' high. When peering into a furnace inspection door it appears as a "wall of flame."

These burners are ignited by four pilot burners which in turn are kept lighted by continuously firing spark plugs operated from ignition transformers. The switch which activates the ignition transformer also opens a solenoid valve in the gas supply line to the pilot burner. This arrangement prevents gas from flowing to the pilot burner unless the spark plug is energized.

The pilot burners take gas directly off the 80 lb fuel header while the gas supply to the main burners is carried through a pressure reducing station, safety interlock, metering run, etc., and is supplied to the burners at pressure from 1 to 25 lb depending upon load. It can be seen from the range of burner pressures that the turn-down ratio of these burners is extremely high.

The basic boiler design was predicated upon the use of 70-100% of relatively high solids water for make-up and the resulting design features, such as 30% blowdown capability, extremely large headers, low furnace heat release and the condenser washer type drum internals, were incorporated to produce the purest steam possible with 100% make-up.

Turbine-Generator

The turbine-generator is a 6,250 kva, 13.8 kv machine. It takes steam at the throttle at 1,000 psig 850 FTT and exhausts to process and auxiliaries at 600 psig 750 FTT. The only weather protection installed is a tailored lagging

3-way answer

to steam trap problems

• This three-way combination can help lick your steam trap problems.

YARWAY IMPULSE STEAM TRAP . . .
the steam trap that gets equipment *hot in a hurry and keeps it hot.* Small size, light weight, *body and all working parts of stainless steel.* Low cost, low maintenance.

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with high-grade woven Monel wire screen that is removed with the cap for easy cleaning. Rust-proof finish . . . straight threads, machined faces and spark-plug type gaskets on screen caps.

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32 trained YARWAY engineers working out of YARWAY branch offices from coast-to-coast, are constantly helping on *trap selection, installation maintenance* and *operation.* Solving your trap problems is their job. It will cost you nothing to call them in to assist you.

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• YARWAY IMPULSE STEAM TRAPS AND STRAINERS are immediately available from more than 250 Industrial Distributors in the United States, Canada, and other countries. For name of one nearest you and FREE Steam Trap Bulletin write . . .

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CONTROL ROOM of Carbide's No. 2 steam and power plant. This is the distribution console with supervisory control panel in center and circuit breaker controls at the right. The 13.8 kv control switches are at bottom right; 2.4 kv switches at top right.

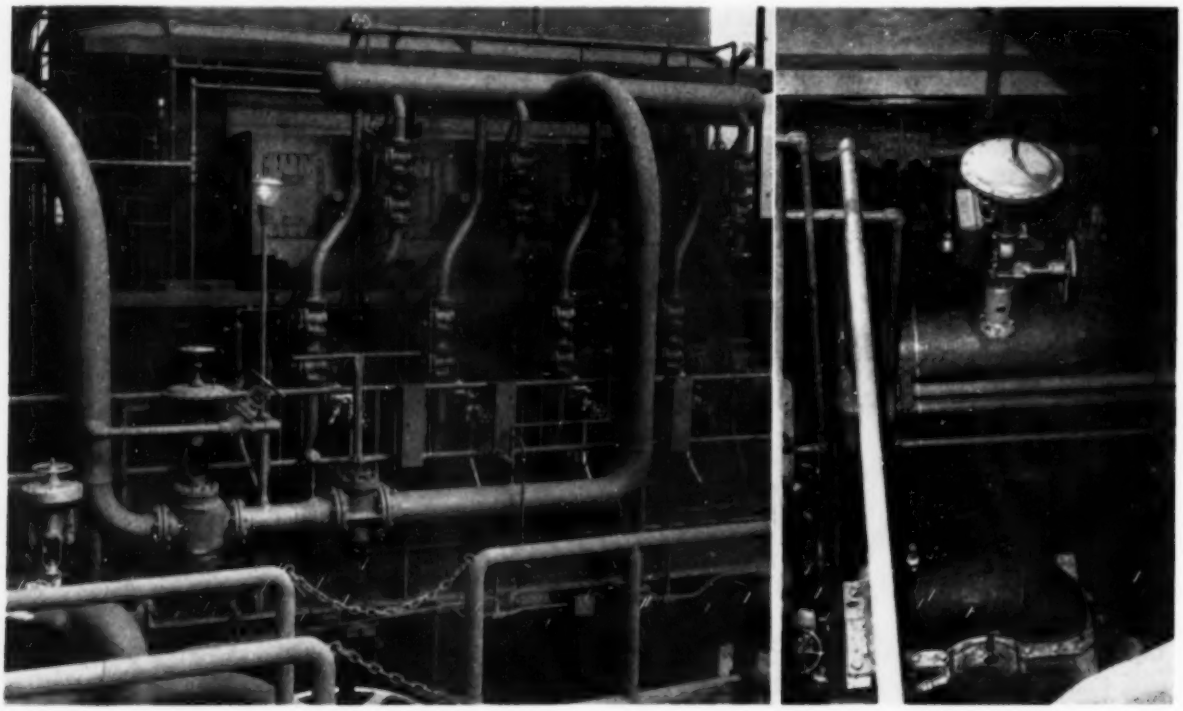
which fits over the turbine, and a walk-in enclosure which covers the exciter. Since the machine is air cooled and the relative humidity often approaches 100%, a marine moisture detector is utilized to indicate excessive moisture in the generator cooling circuit.

Gland leak-off is collected at 70 psig and fed into the feedwater heating cycle; it is also collected at a negative pressure at the end of the gland through an eductor system.

A pressure reducing valve is installed in parallel with the turbine so that total boiler output may be furnished to process even during turbine outages.

Auxiliaries

All major rotating auxiliary equipment is turbine driven and speed controlled. For instance, the



FIRING AISLE closeup of No. 22 boiler as viewed from the turbine pedestal. Gas burners are a new inter-tube design. Note double valves and vents on burners.

BOILER FEED PUMP TURBINE is shown at the right. Speed control valve operated by feedwater controller may be seen in upper part of the photo.

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Detroit 26.....1534 Lafayette Bldg.
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New York 6....3312—165 Broadway Bldg.
Philadelphia 3.1646—1700 Walnut St. Bldg.
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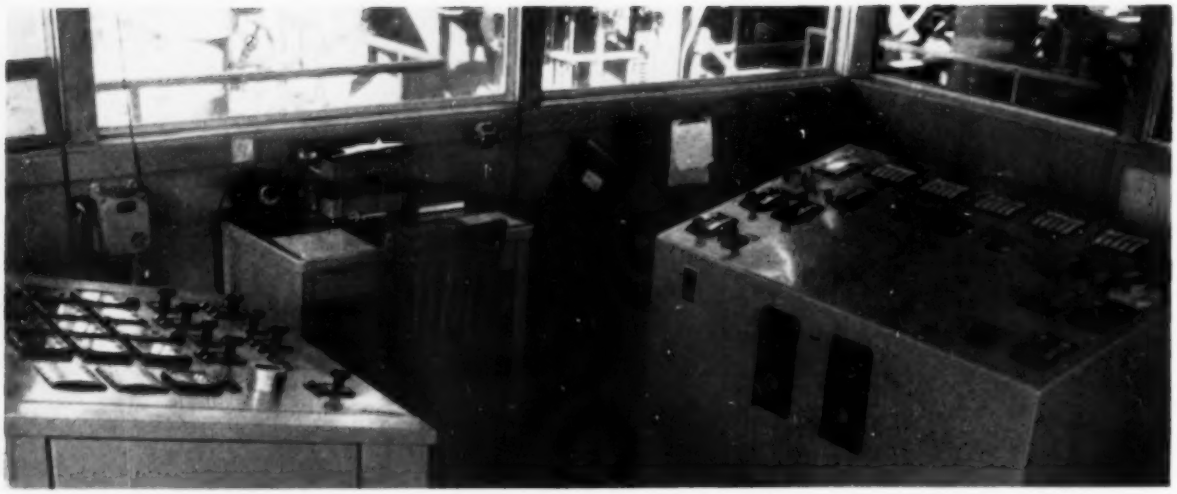


TURBINE CONSOLE is at the left, boiler console right. This is another interior view of the control room looking toward No. 21 boiler. Relays for purge interlocks can be seen on front of boiler console.

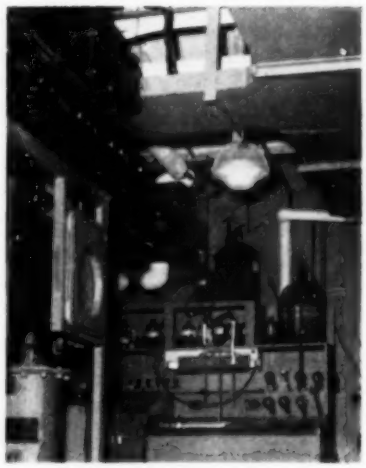
boiler feed pump drives are controlled by a diaphragm motor valve in the steam line to the turbine, which is loaded by the feedwater controller. The 600 lb steam fed to the auxiliary turbines is derived from the generator exhaust. These turbines exhaust at 70 psig to the single deaerating heater.

The deaerator is a vertical tray type unit with external tubular vent condenser. The heating steam is derived from the 70 lb continuous blowdown flash tanks, trap returns and the main plant process distribution system, as well as the auxiliary turbines. Control of deaerator level is maintained by a torsion type level controller actuating steam admission valves on the treated water pump turbines.

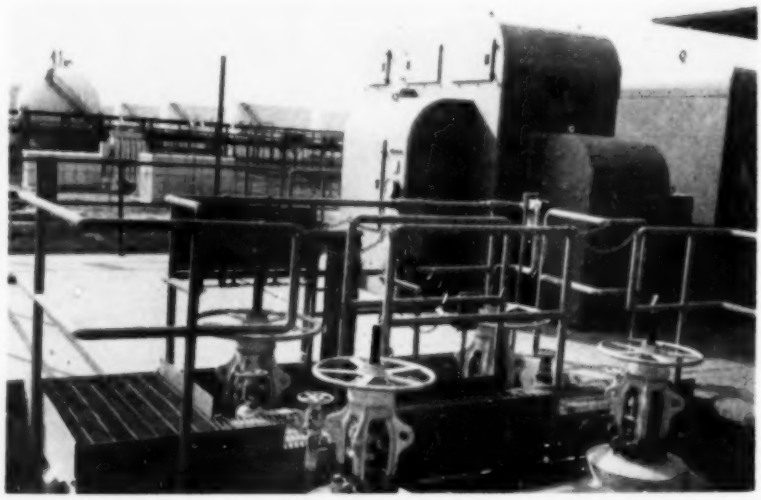
The treated water pumps furnish cold process treated water from a 350,000 gallon storage tank for boiler make-up. Water is supplied to the storage tank from the water treating plant located approximately one-third mile away.

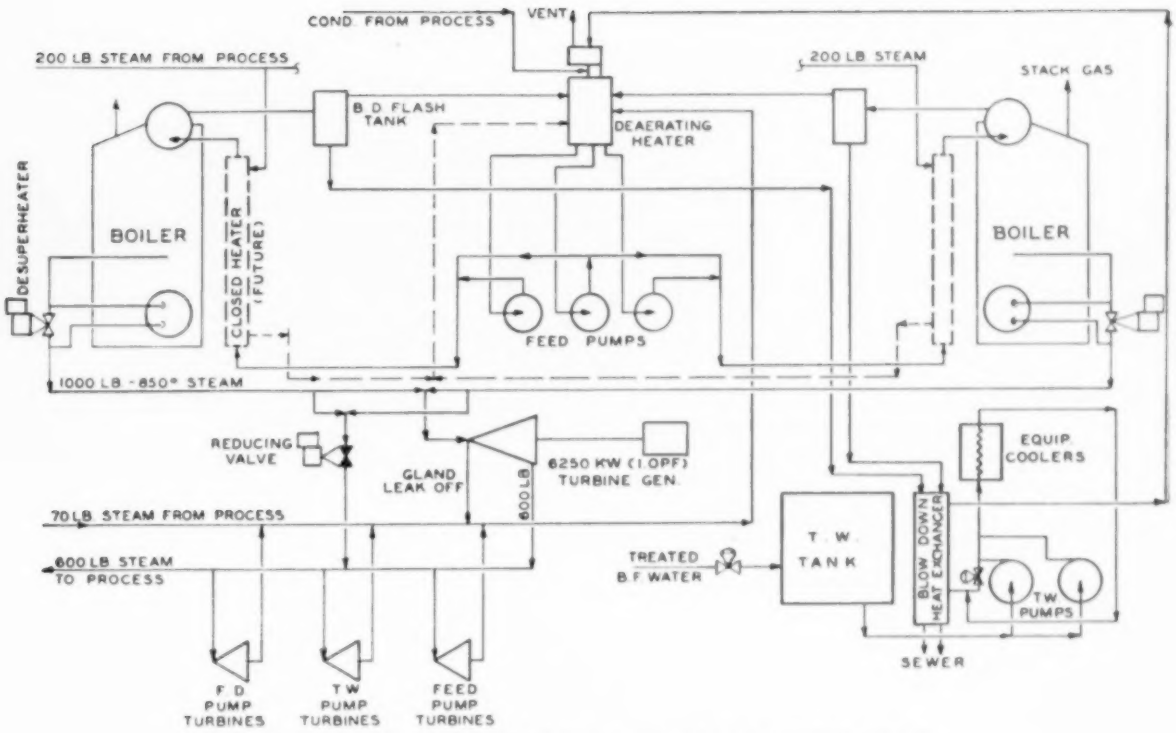
Supplemental boiler feedwater comes from two sources. Condensing turbines in process units supply up to 90 M lb/hr intermittently. Miscellaneous drains within the steam and power plant are segregated as to "clean" and "dirty" water. "Clean" water, suitable for boiler make-up, is col-

LOWER FLOOR of control building. Bailey instrument relays are in the upper left; log desk and titration bench in background. Coolers on boiler feedwater, superheater steam, and boiler blowdown lines cool samples before they are piped to this titration bench for routine analyses. →



TURBINE GENERATOR as seen from the firing aisle of No. 22 boiler. Valve nest in foreground provides shutoff for turbine and reducing station independently from each boiler. Switching station is in background. ↓





FLOW DIAGRAM—CARBIDE'S NO. 2 STEAM AND POWER PLANT

lected in a sub-surface sump then returned to the treated water system by float-controlled, motor-driven pumps. "Dirty" water is sewered.

Cooling water for the generator air cooler, turbine oil coolers and other requirements is furnished from the treated boiler feedwater before it enters the blowdown heat exchanger. A diaphragm motor valve in the treated water line maintains 20 psi differential pressure necessary to circulate cooling water properly. The treated water is fed through the blowdown heat exchanger into the deaerating heater. Two closed heaters are now on order to provide one stage of feedwater heating (with 200 psig steam) between the boiler feed pump and the boilers, to raise feedwater temperature to 370 F. Feedwater is now being fed to the boilers at 316 F.

Sodium sulfite is injected into the storage section of the deaerating heater by small, adjustable stroke proportioning pumps. Sodium hexametaphosphate is fed into the treated water at the water treating plant. However, tanks, pumps and piping are installed so that the phosphate may be injected directly into the boiler drums, if necessary.

Sample coolers are installed on boiler feedwater, superheater steam, and boiler blowdown lines in order to cool samples before they are piped to the titration bench on the lower floor of the control room. Here routine analyses are performed on steam, boiler water, cooling water and all sources of feedwater.

Controls

Primary feedwater and combustion control is exclusively pneumatic. Boiler controls are centralized at a console control board located in the control room. All recording meters are located at the point of measurement and impulses are transmitted to Mini-Line indicators on the console. Relays are located on racks underneath the console board.

Combustion control is pressure regulated with primary control impulse going to fan speed, and gas valve position being reset by ratio control to maintain a preset fuel-air ratio. Combustion control is complicated by widely fluctuating fuel purity with changes in specific gravity bearing no necessary relation to heating value. For this reason the preset fuel-air ratio must be adjusted from time to time by a hand ratio adjustor located on the console. Information from which adjustments are made is indicated by fast response excess oxygen recorders which have Mini-Line receivers on the console.

Boiler feedwater flow is controlled by a 4-element controller. The flows of steam and blowdown leaving the boiler are totaled and compared with the flow of feedwater into the boiler. This resulting impulse is fed into a control relay together with drum level to determine air pressure output to the speed controls on the feed pump turbine.

Protective recirculation for the feed pumps is accomplished by utilizing the transmitted air pressure from the feedwater flow meters to close a recirculating valve

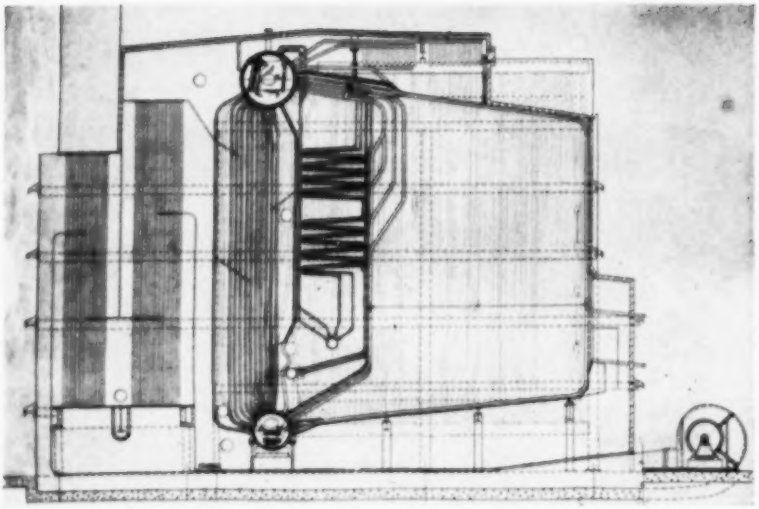
when flow exceeds a predetermined minimum safe flow. A rather elaborate relaying system determines whether each boiler is being fed water by its own pump or by the common spare, and therefore controls the proper recirculating valve no matter which pump is in service.

A supervisory control system monitors bearing temperatures on rotating equipment.

The electrical controls include a turbine generator console and a distribution console. All turbine instruments and control switches are on the former. Also on the turbine console are Mini-Line receivers indicating 600 lb steam flow, pressure and temperature. The control switch for the pressure reducing station is adjacent to the turbine governor control knob, so that steam may be transferred from turbine generator to reducing station and back again.

Control switches and meters for the switching station and 13.8 kv-2.4 kv substation are located on the distribution console. In addition, the distribution console has blank openings for additional feeders which may be installed with future expansion. A miniature annunciator panel is located on the distribution console. The annunciator drop energized blows a howler and shows a flashing light. A reset button de-energizes the howler and flasher relays. When the condition is corrected, the steady light goes out.

Although many of the features incorporated in Carbide's No. 2 Steam and Power Plant at Texas City are not new to the power industry, the plant itself is unique to industrial steam power production. After eight months of operation it is the confirmed opinion of top management, local supervision, and the operators that this type of plant is highly desirable and offers many features not found in previous installations.



SECTIONAL VIEW OF STEAM GENERATING UNIT

N. C. Reactor

(*Starts on page* 74)

ating data is actuated by servomechanisms and instruments which have their nerve center in the control console.

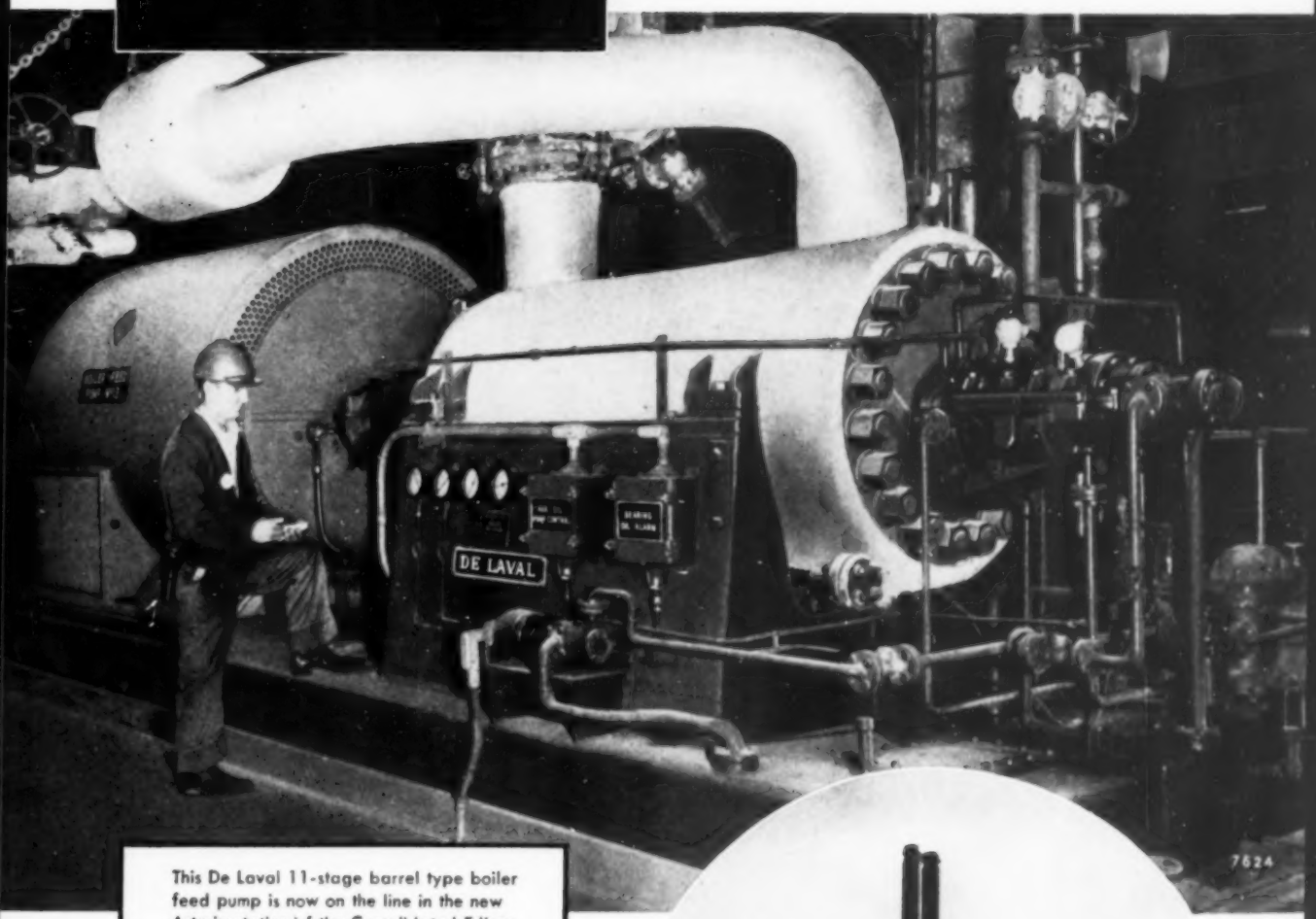
The Raleigh reactor is housed in a 110 sq ft building made possible by a generous gift of $200,000 from the Burlington Mills Foundation. The reactor room is located in the center of this building. On three sides of the building there are located 12 research and instructional laboratories. An observation room, control room entrance lobby and four staff offices are located on the fourth side of the building. The entire reactor installation cost about $500,000.

The Reactor Staff

Chief of the reactor staff is Dr Clifford K. Beck, a distinguished physicist who came to North Carolina State College because of his interest in nuclear engineering education. The reactor is operated under the supervision of members of the Physics Department faculty with the assistance of graduate students. It is interesting to note that the faculty of the Physics Department completely designed the reactor and supervised the manufacture of the reactor core on the college campus. Without their efforts the Raleigh reactor never could have become a reality.

DE LAVAL
BARREL TYPE BOILER FEED PUMP

in new Con Edison Astoria power station



This De Laval 11-stage barrel type boiler feed pump is now on the line in the new Astoria station of the Consolidated Edison Co. of New York.

The De Laval 8/6 pump operates at 129 psig suction pressure and delivers 1,570 gpm of 344 F water against 2,229 discharge pressure. Direct-connected at the end of the boiler feed pump shaft is a De Laval IMO pump for lubrication of the main pump and motor bearings. Also furnished is a motor-driven De Laval IMO auxiliary oil pump with pressure controlled switches. De Laval barrel type boiler feed pumps meet all the requirements of high pressure, high temperature boiler feed service. The distinctive De Laval design assures years of reliable operation with minimum maintenance.

DE LAVAL *Boiler Feed Pumps*

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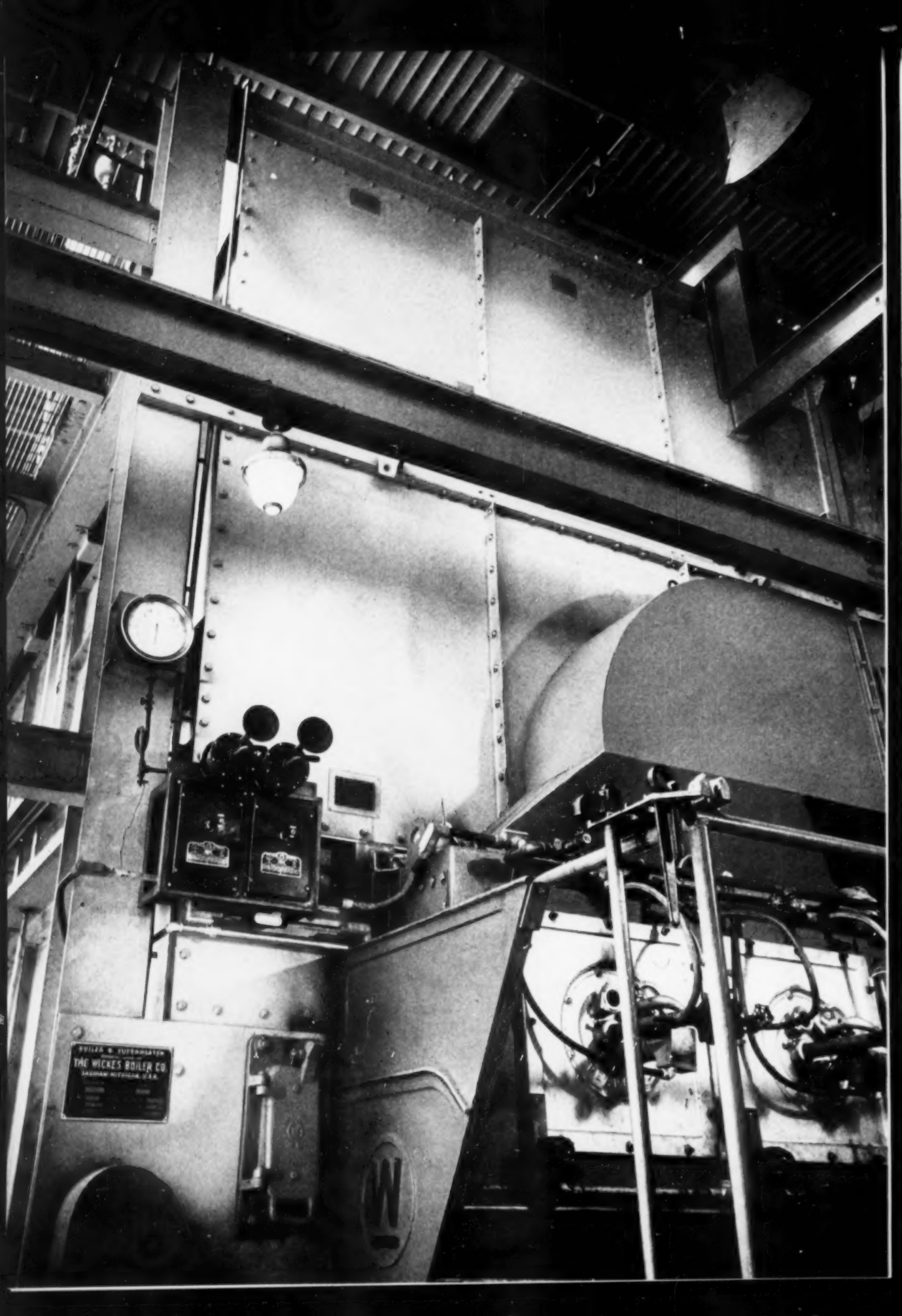
THE WICKES BOILER CO.

WICKES

3-drum boiler at KEELER BRASS COMPANY

Installation of a new 3-drum WICKES Water Tube Steam Generator has substantially increased operating efficiency at the Keeler Brass Company, Grand Rapids, Michigan, the world's largest manufacturer of furniture hardware. The new boiler, a combination oil-fired and underfeeder stoker unit, is capable of producing 40,000 lbs. of steam per hour at 350 psi.

WICKES will design and build water tube steam generators for any practical size and pressure. WICKES also offers a wide choice of auxiliary equipment so that it's possible for you to get not only the best steam generator, but also the best correlated equipment. Contact your nearest WICKES sales representative or write us today.

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Lighting for New Orleans Rope Plant

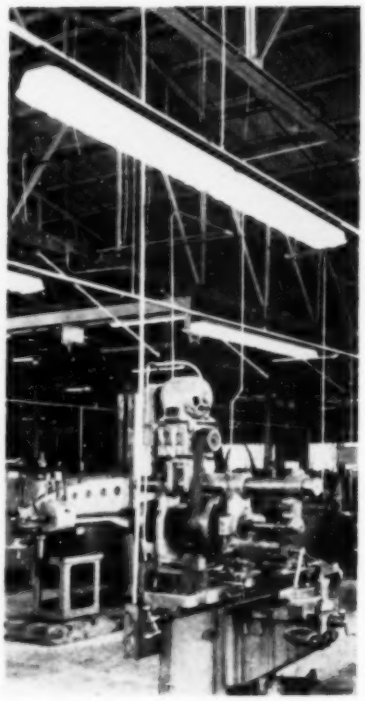
Metal raceways for industrial lighting circuits — rugged, flexible, efficient

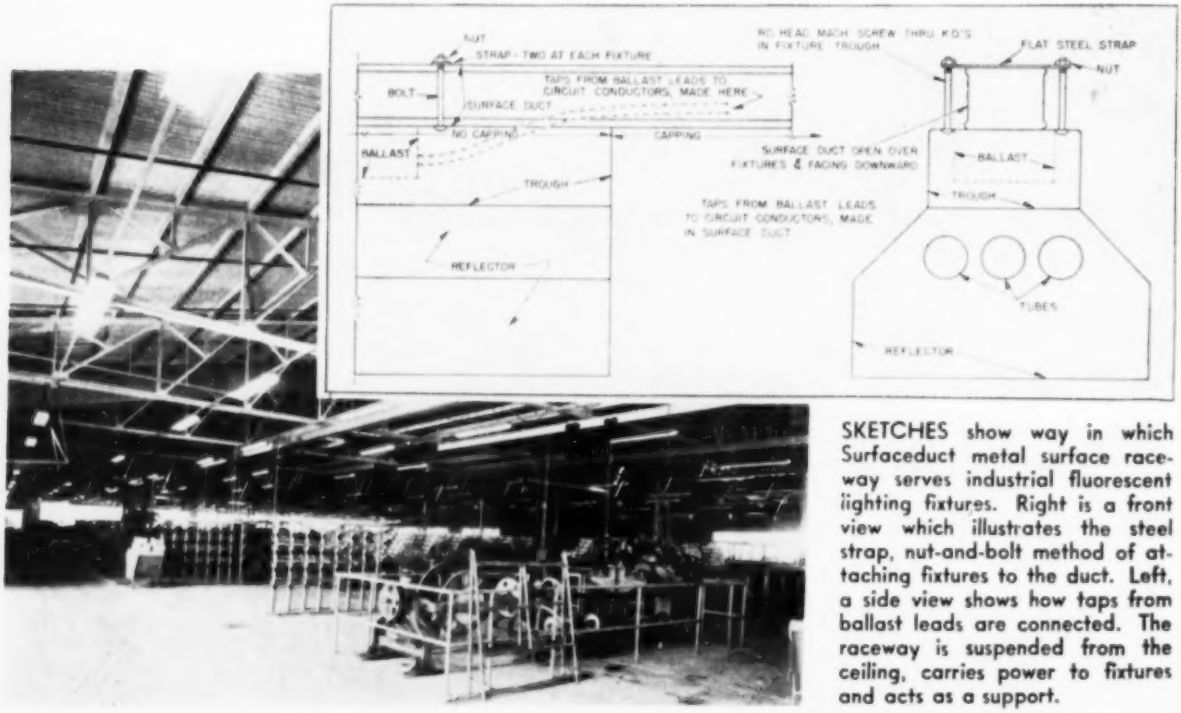
THE fluorescent lighting installation in the Edwin H. Filter Company's manufacturing plant in New Orleans is "modern, flexible, and rugged"—answering the basic requirements of maximum lighting efficiency and trouble-free operation. The Filter Company manufactures twine and rope for commercial and industrial use.

Mr. J. F. Kirkpatrick, resident manager of the company, was favorably impressed with the Surfaceduct he had seen in other applications and requested the architect to incorporate this metal surface raceway in plans for his industrial lighting layouts. Surfaceduct, a development of National Electric Products Corporation of Pittsburgh, is a raceway through which all types of service may be obtained ranging up to 60 amperes. It is well suited to Filter's present lighting needs and provides for future changes.

The duct is suspended from the roof by means of steel straps fastened to fitted hangers. Conductors are laid in the duct and wire-retaining bridges are snapped in. Capping is snapped on the duct and is locked in place by the retaining bridges.

Fluorescent fixtures are attached directly to the bottom of Surfaceduct and taps from ballast leads are connected to conductors carried in the duct. Capping is omitted from the duct at points where the fixtures are attached. A steel strap is placed over the duct, and bolts from the trough through the strap fasten the fixture to the Surfaceduct. The Surfaceduct supports industrial RLM fixtures by means of rigid pipe stems, in addition to accommodating the fluorescent fixtures.





SKETCHES show way in which Surfaceduct metal surface raceway serves industrial fluorescent lighting fixtures. Right is a front view which illustrates the steel strap, nut-and-bolt method of attaching fixtures to the duct. Left, a side view shows how taps from ballast leads are connected. The raceway is suspended from the ceiling, carries power to fixtures and acts as a support.

(*Advertisement*)

What it takes to make a 3000 Degree Refractory Concrete

Because of the widespread interest in the use of refractory castables, many furnace operators have asked us for the story behind the performance of B&W's unique refractory concrete, Kaocast.

Here are the answers to some of the most frequently asked questions:

Q. *When you refer to Kaocast as a 3000 degree refractory castable, do you mean that its melting point is 3000° F?*

A. No, this means that its service use limit is 3000° F; its melting point is 200 degrees higher.

Q. *Just what does it take to make a 3000 degree refractory castable like B&W Kaocast?*

A. Let's first define a few terms. Refractory castables are made with granular materials which are volume stable at high temperatures and which can undergo repeated heating and cooling cycles without disintegration. These materials, known as refractory calcines or grogs, are blended with suitable hydraulic binders. The initial strength of a refractory castable is thus developed in the same manner as that of ordinary concrete—that is, through the chemical action between water and the binder. A strong *ceramic bond* is formed when the refractory castable is subjected to temperatures above the vitrification point.

Q. *Then you have a grog, a binder and a method of putting them together. Which is most important?*

A. You can't say that any *one* is most important. It's a combination of all three. Let's take them one at a time. Our grog consists primarily of the proper blend of kaolin and other alumina-silica materials. This ratio enables us to achieve a grog with minimum expansion and shrinkage, a high fusion point, and greater stability under load, at varying temperatures.

Q. *And now, what about the binder?*

A. There are a number of factors responsible for the success of the Kaocast binder. One is the compound Tricalcium Penta-aluminate (3 lime to 5 alumina). This formula produces the most refractory compound (highest melting point) that can be made from lime and alumina. Another is that by using the purest commercially available lime and alumina, the Kaocast binder is substantially free of iron and silica. Such traces of these that are present combine during the pre-firing of the binder to produce stable compounds.

Q. *Just how important is the manufacturing or "blending" of the grog and the binder?*

A. If one factor could be singled out as "most important" it would be quality control.

Direct control over the fineness of materials, prefiring temperatures, and other phases of manufacture is possible at B&W because both the grog and the binder are made and blended at B&W's Augusta Works—under B&W's direct control and supervision.

Q. *These factors you've discussed must add up to some specific advantages of Kaocast. What are they?*

A. B&W Kaocast has all the advantages of easy installation which are responsible for the widespread interest in refractory concretes, plus these exclusive features: It is the only 3000 degree refractory concrete with high resistance to spalling and low volume change throughout its operating range.

THE BABCOCK & WILCOX CO.
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Works: Augusta, Ga.

Emergency Power

For Florida Power & Light Co.

By LOWIS BOWERS
Miami, Florida

700 KW mobile plants, mounted on special 74 ft railway flat cars, have 2-cycle diesel units, G-E generators, Wagner transformers, Young fans and radiators, Ingersoll-Rand compressors, and Burgess-Manning silencers. (See completed installation below.)

SERVING one of the nation's fastest and most steadily growing states, Florida Power & Light Co. is faced with the additional problem of sharply increased use of electricity during winter months when hundreds of thousands of tourists visit Florida.

The Florida utility has more than tripled its system capability since V-J Day and now has in full swing a $332 million building program. Meanwhile, mobile generating equipment has proven to be a practical and versatile means of supplying emergency power. In addition to nine smaller generating units mounted on highway trailers, two railway plants are used.

These 700 kw generating plants are mounted on special 74-ft railway flat cars and are moved swiftly up or down the peninsula, wherever needed.

When Miami's largest office building discontinued producing its own electricity and became a Florida P&L Co. customer, the utility took over the two 1000 hp, 600 rpm, 2-cycle diesel units made by General Motors Corp.

Having no generating plant in which to install them, Florida P&L Co. engineers made studies and cost analyses and decided to convert the units for mobile power purposes. The final cost was approximately two-thirds of the market price for ready-made portable units.

Designed for continuous service if necessary, the generators are mounted on two circus flat cars, each reinforced to carry 100,000 lb. No special routing is required since Florida P&L planned the equipment to conform with railroad requirements as to clearance, weight and safety.

The engines are driven by 700 kw 875 kva-0.8 pf, 600 rpm General Electric Co. generators. Wagner Electric Co. manufactured the 2400-13, 200 volt 750 kva transformers.

Design Features

A number of changes and adaptations were necessary. Before the generators could be mounted on the flat cars, the generators had to be rewound to turn out 2400/4160 volts. Space requirements and hazards connected with transporting liquid-filled cells ruled out use of batteries for starting the diesel engines.

Electrical starting equipment was removed and an air motor was installed alongside the generator. Tanks for compressed air were located beneath the car.

A horizontal fuel tank was located crosswise on each car at the opposite end from the generators. Each tank holds approximately 1,680 gallons—enough for about a day and a half of operations at top capacity.

Water for the engine is cooled by running through radiators located in the center of the car. Air is drawn through three windows located mid-car, carried through the radiators and out exhaust vents on top. The lubricating oil is cooled by a heat exchanger introduced into the engine cooling water circuit.

BESIDES helping to meet emergency needs for electricity in the winter months, these Florida Power & Light Co. portable generating plants make it possible to quickly restore service in storm-damaged communities.

Oriole...

...now a "big league" name in BASEBALL as well as COAL!

Good luck to the Baltimore Orioles Baseball Team! We hope they'll make the name ORIOLE as famous in the American League as it is in the industrial coal league!

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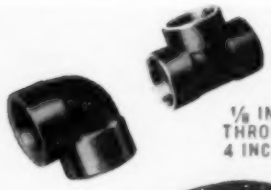

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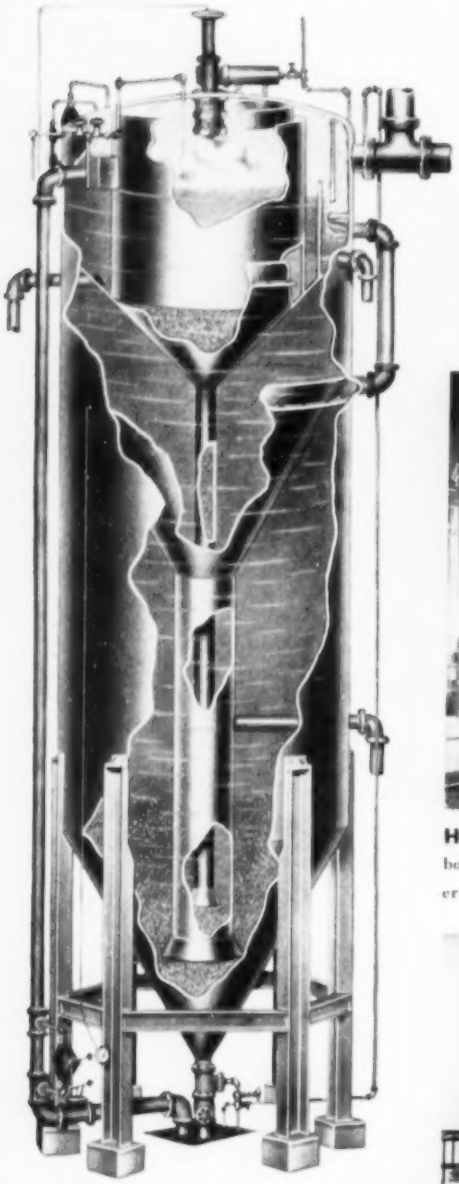
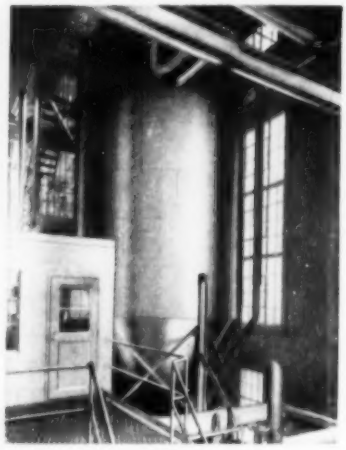
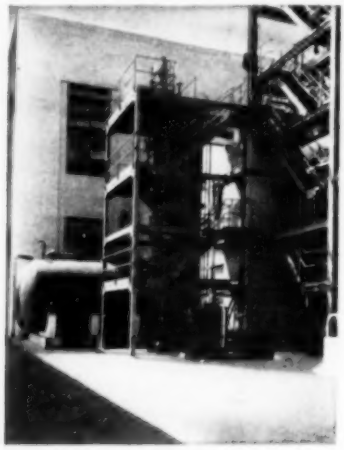


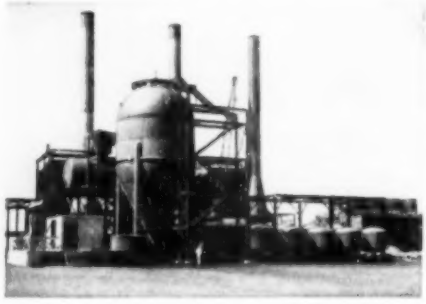
Belco-designed equipment provides high operating efficiency at low operating costs. Many of the country's largest industries rely on Belco for their water conditioning equipment. For example, Belco has built the largest fully automatic demineralization plant in the world and is currently furnishing one of the largest hot lime zeolite installations. A consultation with Belco could lead to lower operating costs for you, too. Write or call for technical assistance at any time.



HOT LIME SODA — Installation in boiler house at large eastern oil refinery. Has capacity of 200,000 lbs/hr.



HOT LIME SODA — Installation in large southwestern utility. One of three units with 90,000 lbs/hr total capacity.



HOT LIME BELCOLITE — Installation at large southern chemical company. Capacity 600,000 lbs/hr. This plant embodies "thoroughfare" operation of separate deaerator and hot process tank. The large hot process tank was designed, built and erected by Belco under its contract with customer.

Illustrated literature "Belco In Pictures" is available on request. Write for copy, today.

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Processes for Removal of Water Impurities

Boiler Feedwater Heaters • Water Softeners • Filters • Clarators
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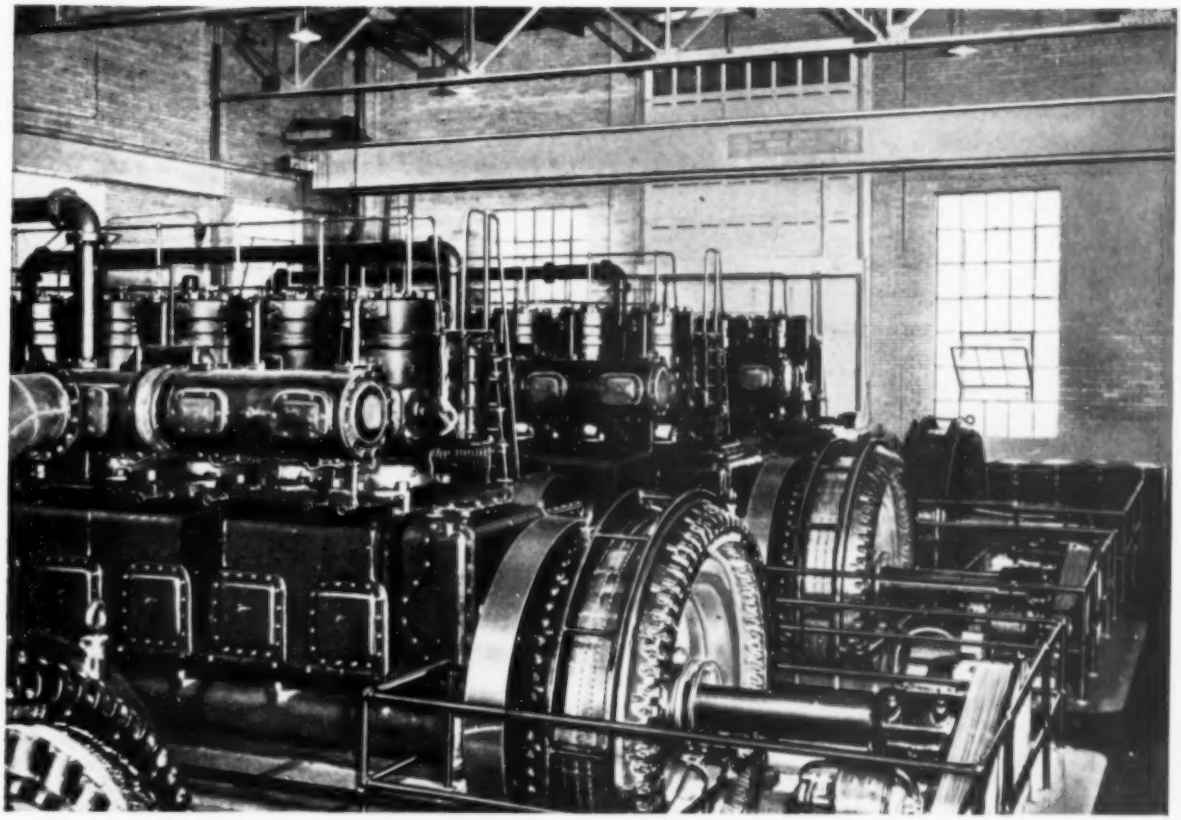
BELCO DESIGNS, ENGINEERS & FABRICATES WATER PROCESSING EQUIPMENT



"We're Proud of This Plant!"

says Don H. Decker, — Plant Supt., Thumb Electric Cooperative, Ubly, Mich.

Manager Orville Hurford and Mr. Decker are justifiably proud of their 4-diesel engine generating station. The plant has been an outstanding financial success since the day it was first opened. Several times it has occupied #1 position on the REA Running Plant capacity chart.

Mr. Decker writes, "A large part of our operating success we attribute to Sinclair GASCON® D oil. It has given us an excellent rate of consumption while reducing wear. In fact, *cylinder and piston ring wear is much below normal based on other plants of equal capacity.* Something else we appreciate is the timely visits of the Sinclair Lubrication Engineers."

Top quality lubricants plus the assistance of Sinclair Lubrication Engineers are two of the reasons why Sinclair can play a large part in the success of *your* operation. Your local Sinclair Representative will be happy to explain the remaining reasons. Phone him or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR DIESEL LUBRICANTS

save Wear and Replacement

Schedules and Records for Maintenance

Cone Mills' system gives life record of equipment at a glance; keeps maintenance on schedule.

A NEW EQUIPMENT record and preventive maintenance schedule system recently put into operation at Cone Mills Corp. makes it possible to locate in a few seconds all pertinent data on the life record of any piece of electrical equipment in the company's Greensboro, N. C., plants. The system also provides for automatic reminding of inspection dates on equipment.

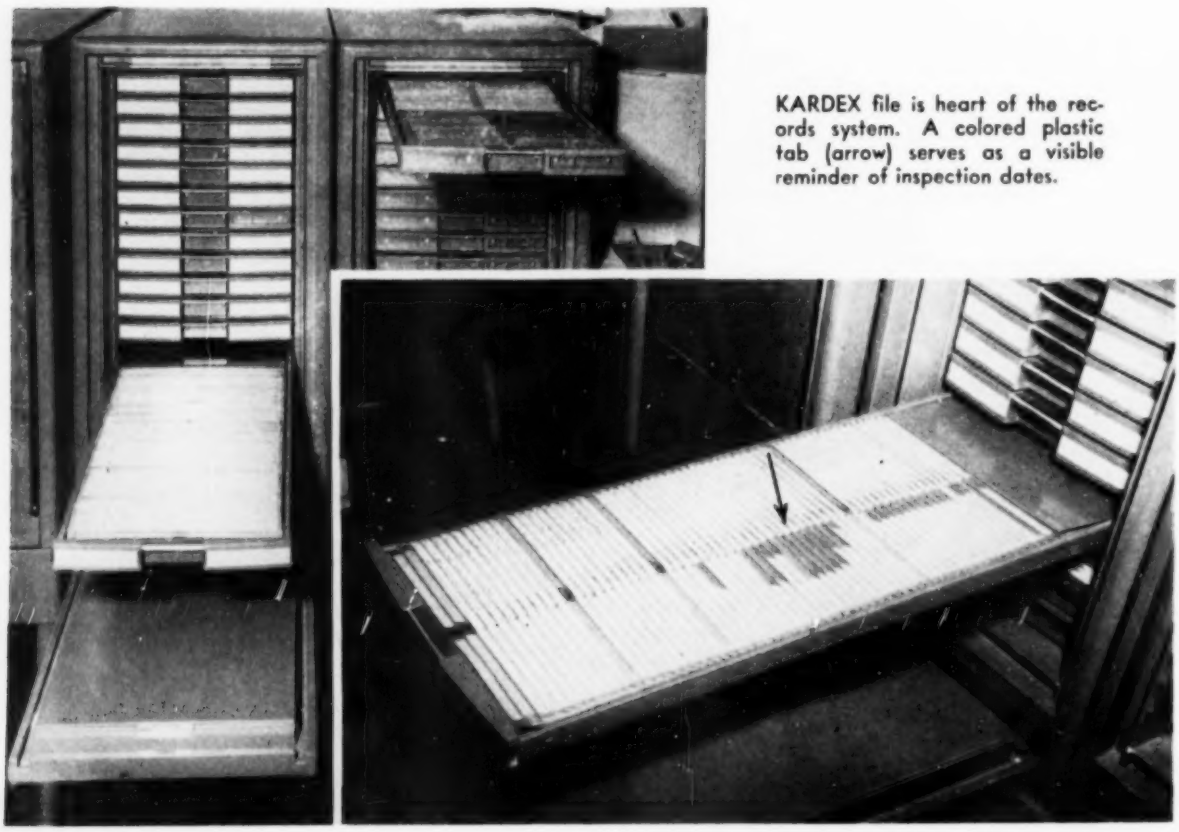
The system records the location and installation date of each piece of electrical equipment, inspections and their findings, replacements and repairs, location of spare equipment in storage, parts ordering information, and condition of major feeders and circuit breakers.

Although the record system is at present used only for electrical equipment, it is so arranged that it can be extended to include maintenance records on other production machinery and auxiliary equipment.

Records System

The heart of the arrangement is a Kardex file system. This consists of a metal cabinet with a number of shallow drawers, each of which contains a series of overlapping plastic pockets. One pocket is assigned to each piece of machinery, and is used to hold three record cards for that item of equipment.

The bottom leaf of the pocket holds an 8 x 5 card detailing the maintenance record for the machine. The top leaf holds two 4 x 5 cards; one for the motor and one for the controls. These latter two



KARDEX file is heart of the records system. A colored plastic tab (arrow) serves as a visible reminder of inspection dates.

MACHINE CARD is the same on both sides. It details the maintenance, repair, and replacement record of electrical equipment used with the machine.

motor installed new 1937 — MACHINE MAINTENANCE RECORD

DATE	WORK DONE	DATE	WORK DONE
8 1 53	Motor lubricated checked, cleaned and repaired both linestarter and drum switch (no new parts needed)		
10 5 53	replaced coil on linestarter replaced contacts on linestarter		
12 8 53	replaced motor (bearing down)		

CONE MILLS CORP. GREENSBORO, N.C.

W.O. | Frame # 12 | Filling Spinning Frame

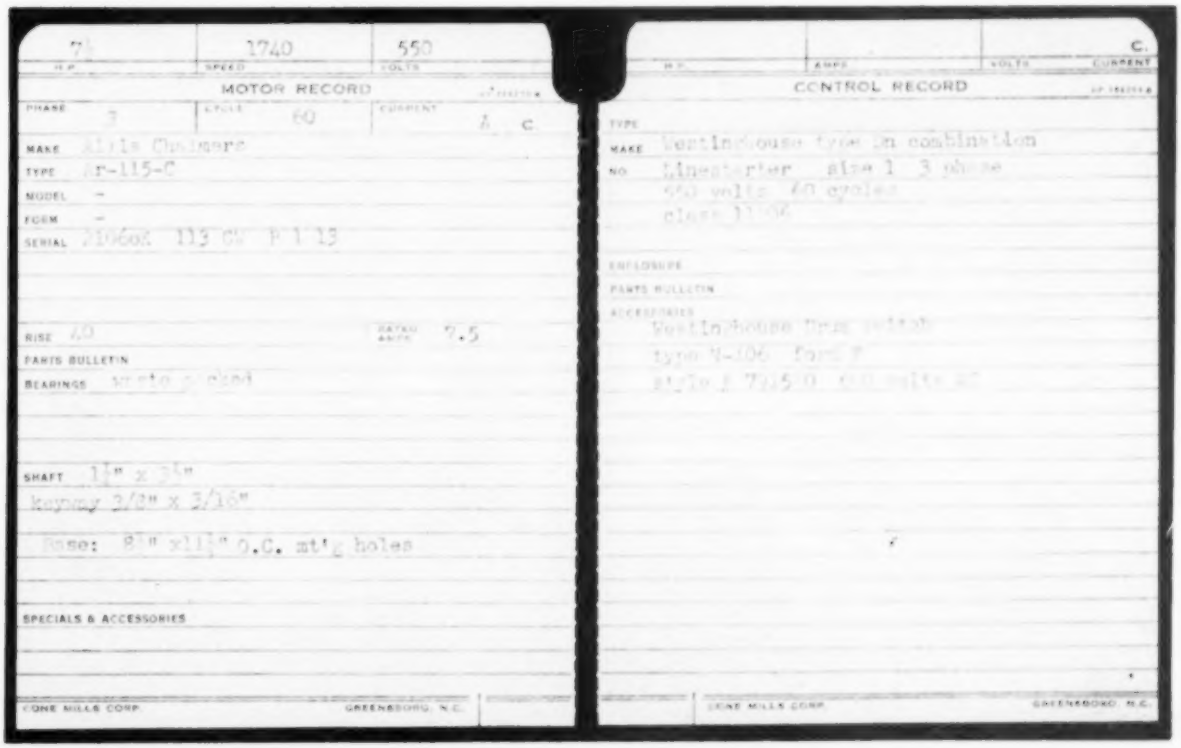
cards give the specifications of the motor and controls on one side, and on the reverse side, their life record.

Space is provided for an additional card to be slipped behind the motor and control cards. This card will contain special data, such as gear unit information on a gear motor, coupling information on a hydraulic-drive job, and the like.

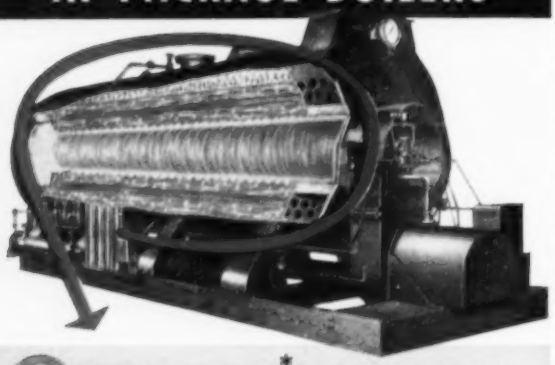
A glance at these cards shows what motor is installed at a given machine, what controls are installed with the motor, and gives a history of the inspections and repairs on that machine.

The motor and control cards in a certain machine pocket show the information on the equipment

SPECIFICATIONS are given on face of motor card (left) and the control card (right). The reverse sides of both of these cards are the same, and give the maintenance and repair records for each piece of equipment.



THE BIG DIFFERENCE IN PACKAGE BOILERS



CYCLOTHERM* CYCLONIC COMBUSTION gives you 66% MORE POWER per sq. ft. of heating surface

The cyclonic action of the flame revolves evenly in a free spiraling vortex the full length of the furnace and provides an even rate of heat transfer throughout the entire length of the combustion chamber.

This controlled combustion reduces heating surface requirements from 5 to just 3 sq. ft. per B. H. P. giving 66% more power.

Plus These Important Features

- **Saves up to ⅓ the Space of Conventional Package Units**
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- **No Hot Spots or Flame Impingements**
- **Burns Oil, Gas or Both**
- **Savings up to 50% on Maintenance**
- **No Expensive Stacks or Foundations to Build**
- **Greater Fuel Savings**

And That's Not All . . .

Cyclotherm Steam Generators with *patented* Cyclotherm Cyclonic Combustion gives you: Full power operation from a cold start in 15 to 20 minutes; Built in accordance with A.S.M.E. and Nat'l. Board Standards and bears the label of Underwriters Laboratories Inc.; Complete range of sizes from 18 to 500 h.p., 15 to 200 psi operation pressure.

WRITE TODAY for your copy of "All Your Questions Are Answered by Cyclotherm" and find out why Cyclotherm Steam Generators have been proven superior in thousands of installations. Just drop a post card to Cyclotherm, Dept. 34 Oswego, New York.

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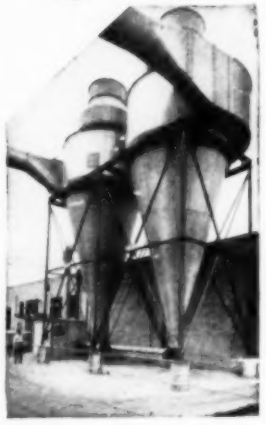
E. L. BRUCE CO.,
Memphis, Tennessee



Two of a number of the new, more efficient "Type C" KIRK & BLUM Centrifugal collectors serving this modern woodworking plant.

E. L. Bruce Company, the world's largest manufacturer of hardwood floors, selected KIRK & BLUM to revamp and modernize their dust control system.

In the Bruce plant, Kirk & Blum engineers provided a flexibility and efficiency in operation never before attained. "Unitized" systems permit operation of any line or combination of lines, independent of the others. This provides versatility of operation as production requires. In the flooring finishing department, two independent systems provide the same versatility.

Kirk & Blum can show you how new or increased Dust Control capacity can improve efficiency in your plant.

Write for Literature
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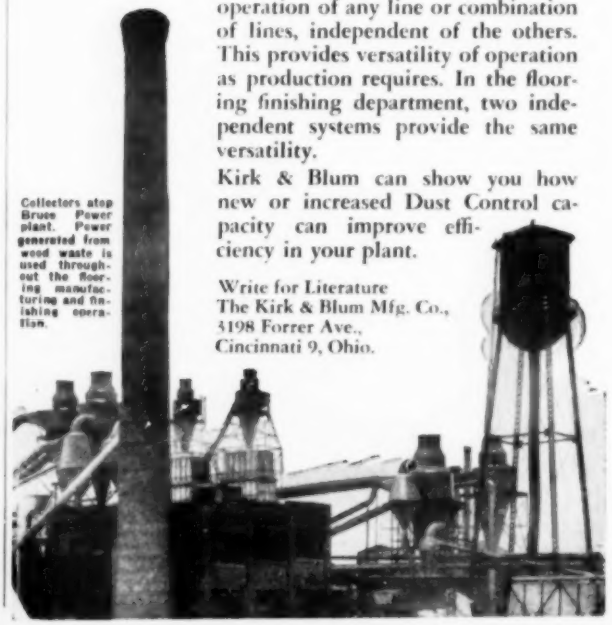
Cincinnati 9, Ohio.



Collectors atop Bruce Power plant. Power generated from wood waste is used throughout the flooring manufacturing and finishing operation.

there at the time. When different motors or controls are installed, the cards are changed to correspond.

All motors in spare stock have their data similarly recorded, and the cards for these motors are filed by horsepower and speed, with a notation of where they are stored. Cards for spare control equipment are handled in the same manner. When motors or controls are put into service, their cards are taken from the spare file and inserted in the proper section of the machine pocket.

A machine card is made for each individually motored machine, for each group of machines driven from a single line shaft drive motor, and for each piece of accessory equipment. Machines with multi-motor drives have a notation on their cards, "Refer to detail file." This detail file contains motor and control data in 8½ x 11 folders with binding clips, and in the folder are all pertinent prints, instruction books, and other manufacturers' data, as well as blank sheets for posting the life history of the equipment.

In departments where there are too many machines to make it practical to carry an individual card record on each motor, one card is carried on those handled by a group starter. For example, about 100 looms are carried on one weave room record card.

Separate cabinets are provided for each mill, and separate drawers for different departments.

The files are kept current by having copies of each job order and repair order go to Maintenance Records, where all necessary data are posted on the proper cards.

Location of Equipment

The basic numbering scheme is tied into previously established machine numbers, since all production machinery is numbered for production use. Cards are grouped in drawers according to these numbers. Cards for accessory equipment, such as ventilating fans, condensate pumps, unit heaters, and so on, are filed at the end of each drawer.

In large production areas, a separate numbering system is required to pinpoint the location of accessory equipment. At Cone Mills, column lines across the width of each building are designated by letters, and bay spacing along the length of the building by numbers. Column lines have the same designation from the basement through any number of floors above. Location A-1 is always the northwest corner of the building. All columns and pilasters are stenciled with the appropriate letter and number.

Location of accessory equipment is recorded by these bay numbers.

Maintenance Reminder

A strip of paper with the names of the months printed across it is inserted at the front edge of each plastic pocket. A colored plastic index tab set to a month on the paper is a visible reminder of scheduled maintenance dates.

At the first of each week the drawers are checked, and job orders issued for the machines whose cards show reminder tabs.

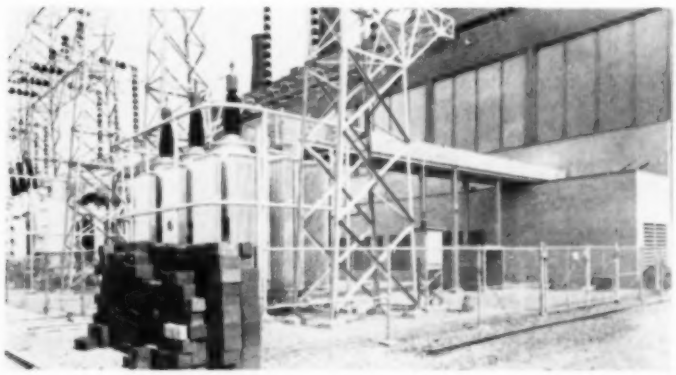
When the inspection is completed, the job ticket is returned to the records department for posting on the history card of the machine involved. The reminder tab is then advanced to the next scheduled inspection date.

Major Power Equipment

Cards for major power equipment, such as oil circuit breakers, high voltage feeders and main feeders, are grouped by geographical location in the particular mill to which they apply.

All high voltage underground cables are numbered as they leave the substation: HV-1, HV-2, HV-3, and so on. HV-1 indicates that this is the high voltage feeder handling power to unit substation No. 1.

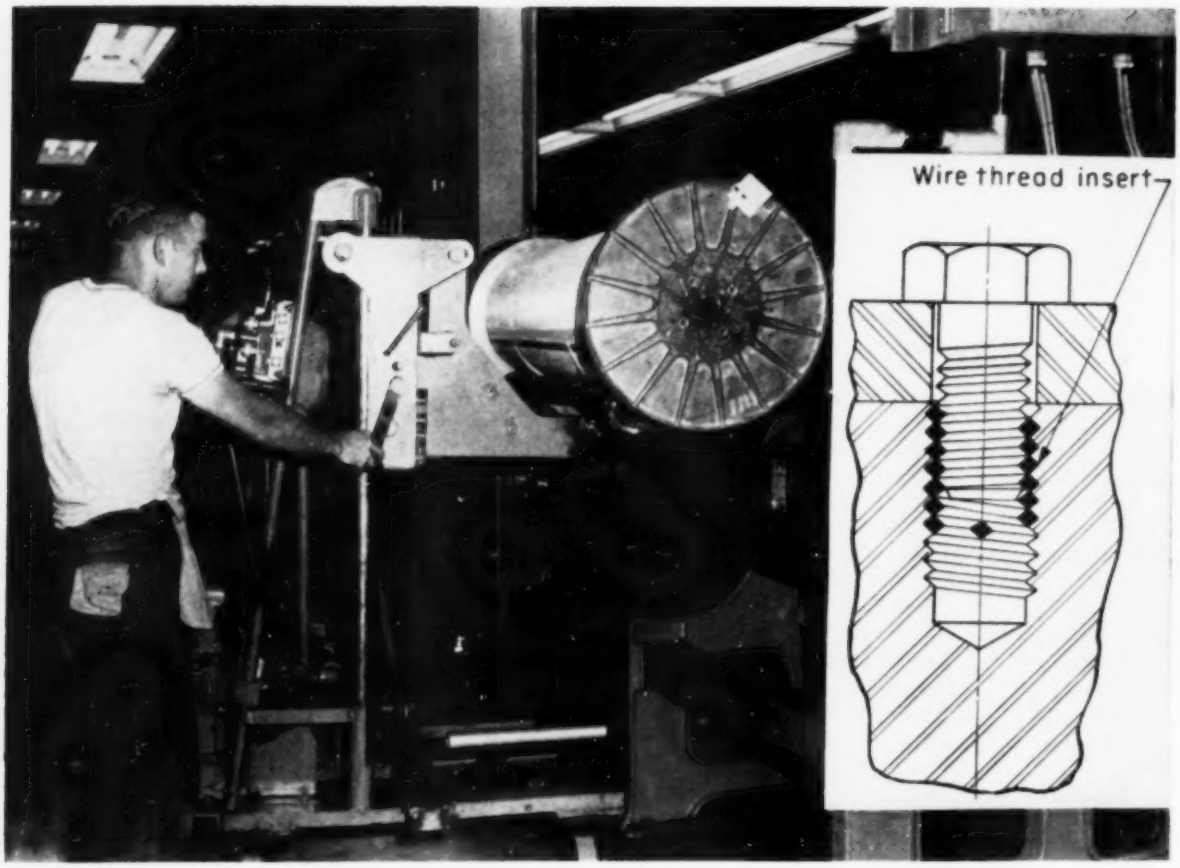
600 V air circuit breakers are lettered A, B, C, D. . . . This designation is carried on into the mill; thus, a spinning frame controller numbered 1A1 would indicate that pulling disconnect 1A1 would take power off this controller, and that it was fed through circuit breaker A of unit substation No. 1.



Low Cost Maintenance With Wrought Iron Pipe

FIRE protection lines of common station service transformers is only one of a number of important services in which corrosion resistant wrought iron pipe is specified to effect low-cost maintenance at Tennessee Valley Authority's Widows Creek Steam Plant.

Other applications include: yard lubricating oil lines, compressed air lines, drain lines, water lines, exposed plumbing, buried piping at oil storage tanks, switchyard oil and water lines, and various embedded and exposed piping installations. Thus far more than 175 tons of wrought iron pipe, ranging in size from ½" to 12", are employed by T.V.A. Engineers to protect service lines of the new project against deterioration from corrosion.



Tapped holes reinforced . .

Wire Thread Inserts Make Light Textile Beams More Serviceable

By WILLIAM A. MAXSON
Textile Division
Hayes Industries, Inc.

MAGNESIUM is particularly desirable for large detachable components that must periodically be carried about, such as the textile beams used in warp-knitting equipment at the Bridgewater, Va., plant of Celanese Corporation of America. Because they are handled frequently (every time the knitter is reloaded as shown above) the beams must be as light as possible.

However, threads tapped in magnesium will not withstand the wear of frequently turning in and removing flange bolts used to mount the beams to their spindles in the machines. To correct this weakness we reinforce the tapped holes with helically wound, stainless steel wire thread inserts.

The inserts when threaded into the flanges virtually become an integral part of the beam, and have hardness and smoothness sufficient to withstand the recurring wear.

These inserts, manufactured by Heli-Coil Corporation of Danbury, Conn., are threaded into holes tapped into the magnesium. Drills and taps for the holes are selected according to the insert manufacturer's specifications. After installation, the inserts, having a free OD slightly greater than the hole prepared for them, spring out against the threaded wall of the hole and lock in place.

The inserts provide protection against wear because the surface of the rolled wire is smooth, dense and relatively hard. Surface smoothness is maintained at 8-10 micro inches and hardness is Rockwell 45 on the C scale.

The beams require six inserts in each flange. We use a special fixture to drill and tap the holes in which the inserts are installed. Each insert is turned in far enough so that the end of the wire is at least ¼ turn below the top of the hole. This insures that the mouth of the hole will not be damaged if a bolt should be subject to severe tension when improperly engaged in only a few coil threads of the insert.

To date we have used the insert in about 600 beams, all of which are in constant use. Threads in these holes are as good as new.

FAST FREIGHT?

No. 153 is almost as fast as "The Crescent!"

Here's what the Southern means by "*fast* freight." Its No. 153 makes the 631-mile run from Potomac Yard (across the river from Washington, D. C.) to Atlanta in 15 hours and 45 minutes. This is only 2 hours and 13 minutes longer than the schedule over the same route of our finest passenger streamliner, "The Crescent."

No. 153 is a good example of our new, improved freight train schedules *in action.* There are many more — thanks to complete dieselization, new and modernized yards, improved techniques of all kinds. *Save time . . . ship Southern!*

THE SOUTHERN SERVES THE SOUTH

SOUTHERN RAILWAY SYSTEM

Push button control in Louisiana compressor station . .

Gas Turbine Driven Compressor

United Gas Pipe Line Company's Station—Napoleonville, La.

Use of turbine power to move gas by centrifugal compression is a recent development for the industry. The oldest such installation has been in operation only since 1948.

SINCE November 1953, a new gas turbine driven centrifugal compressor installed at Napoleonville, La., has been providing the initial boost for gas transported in United Gas Pipe Line Company's 30 in. main line from South Louisiana to Kosciusko, Miss. The installation marked United's initial use of gas turbines for compression of gas. The other 33 stations all have reciprocating or piston type engines.

Gas Turbine Data

The turbine is a General Electric 5,700 hp two-shaft machine fueled by natural gas from the pipe line. The fuel gas is burned with compressed air in the combustion chambers of the unit to provide a jet stream of hot gases which furnishes energy to drive the DeLaval centrifugal compressor. Gas pressures are boosted from approximately 795 lb to a maximum of 925 lb.

The compressor rotates at 5,500 rpm and is designed to handle as much as 800,000,000 cu ft of gas per day.

The turbine weighs approximately 50,000 lb and consists of a 14-stage axial flow air compressor, six combustion chambers, a first stage turbine which drives the air compressor, and the second stage or load turbine which drives the centrifugal gas compressor. The two turbine wheels operate on separate shafts and are divided by a set of variable nozzles to provide greater efficiency in operation. The nozzles are also shaped to enable the combustion gases to expand and hit the load turbine blades at the proper angle for the most effective impulse.

The air compressor, regenerator, combustion chambers and first stage turbine comprise what is known as the "hot gas generating set" of the unit. By burning natural gas and compressed air in the combustion chambers, it furnishes a fast moving stream of hot gases to drive turbine wheels for both the air compressor and the gas compressor.

With the station running at full load, approximately 113,000,000 standard cu ft of air per day is compressed. This requires about 12,400 hp. An additional 5,700 hp is produced to drive the centrifugal gas compressor, making a total of 18,100 hp developed within the turbine.

Turbine control is designed so that station operation can be automatically regulated by the discharge pressure. The pressure can thus be held to a desired point by automatically adjusting the turbine speed in response to deviation from that point. If the turbine attempts to pull the suction pressure down below a set minimum in order to hold the discharge pressure constant, then the suction pressure automatically takes over and regulates the speed to keep the suction pressure from falling below the desired point.

Regenerator

Air for combustion, after being cleaned of dust, insects, etc., in an air washer, is gathered by the 14-stage axial flow air compressor that works in much the same manner as a series of fans. Each stage compresses the air a bit more until at the discharge end it is approximately five times atmospheric pressure and has a temperature of about 476 F. The air is then routed through the regenerator where it picks up additional heat from the turbine exhaust gases, increasing the temperature to 800 F.

Air at this temperature and pressure enters the combustion chambers along with a metered supply of natural gas (at 150 lb pressure) from the pipe line. When ignited, combustion takes place with an excess of air to form a mass of hot gases at a temperature of about 1450 F. Since some of this energy must drive the air compressor, the gases are first expanded through a set of stationary nozzles and directed against the blades of the first stage turbine. Losing only a part of their energy here, the fast moving hot gases pass through another set of nozzles—positions of which can be varied—to hit the blades of the load turbine. This turbine wheel is coupled to DeLaval gas compres-

Plant descriptive data published through cooperation of the staff of **United Gas Log**, monthly publication of the United Gas Corporation, Shreveport, La.

Operating personnel of United Gas Pipe Line Company's Napoleonville, Louisiana, station include: Chief Engineer, **C. W. Epps**; First Engineer, **L. C. Woerndel**; Shift Engineers, **B. E. Clark, W. B. Taylor, V. V. Thompson** and **Sable Bush**.

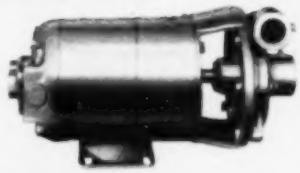
LOOK TO THE LEADER—*LOOK TO PEERLESS*

For All Your Needs for END-SUCTION PUMPS

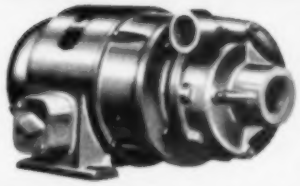
IT'S THE PEERLESS *Fluidyne* **LINE**

FOR ALL THESE MODELS

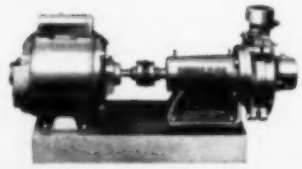
¼-1½ hp FACEMOUNT



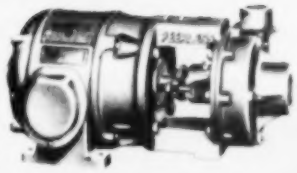
2, 3, 5 hp FACEMOUNT



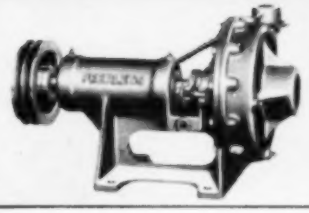
FLEXIBLE-COUPLED Fractional hp



5-50 hp DIRECT CONNECTED



FLEXIBLE-COUPLED Integral hp



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HEADS:	Up to 260 ft.
CAPACITIES:	5 to 5500 gpm
MOTOR SIZES:	¼ to 150 hp

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For All Your Air Conditioning Applications There's One Line of Pumps That Has Been Proved—The Peerless Fluidyne Line.

THOUSANDS SOLD FOR:

(1) COOLING TOWERS
(2) CHILLED WATER SERVICE
(3) HEAT EXCHANGERS
(4) COMMERCIAL AND RESIDENTIAL AIR CONDITIONING
(5) BOOSTERS
(6) TRANSFER SERVICE

ALSO CHOOSE PEERLESS FOR THESE OUTSTANDING MECHANICAL FEATURES

Stainless Steel Shaft
(Rust-Proof—Corrosion-Free)

Mechanical Shaft Seal (Leak Proof)
In Models up to 5 hp Type PE
In Models up to 1½ hp Type PB

Bronze Impeller
(Same as used in Largest, Highest Quality Industrial Pumps)

Cast Iron Case
(Heavy and Durable)

Nationally-Known Motor Brands
(Fully Guaranteed)

It's the Fluidyne Line for ALL THESE OUTSTANDING FEATURES:

They're ECONOMICAL. Designed with economy in first cost, installation, maintenance and operation in mind—all without compromise in quality.

They're DURABLE. Every consideration has been given in design and construction to assure long service life even under abnormal service.

They're EFFICIENT. In all sizes, types and models the Fluidyne line is characterized by high performance ratings.

They're VERSATILE. Indoors or out, every general utility pumping service can use Peerless Fluidyne Pumps.

They're COMPACT. Space costs money; Fluidyne pumps fit neatly into both piping and pumping layouts as well as into sub-assemblies.

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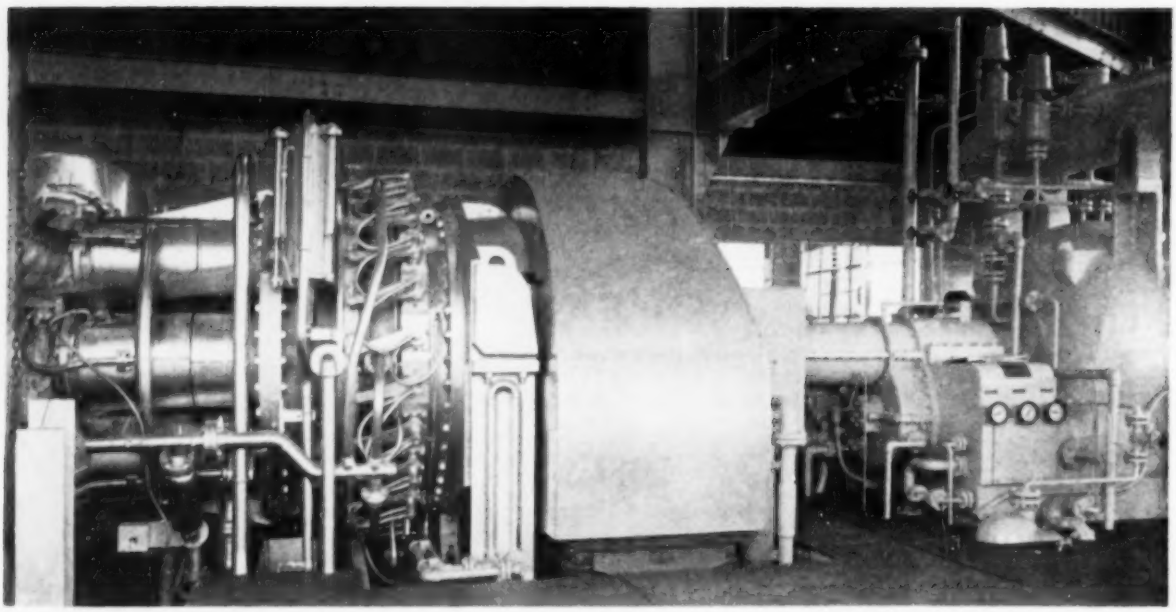
PEERLESS PUMPS fmc



THIS 5,700 hp, two-shaft General Electric turbine drives the DeLaval centrifugal gas compressor.

sor, and its drive is what determines the actual output of the station.

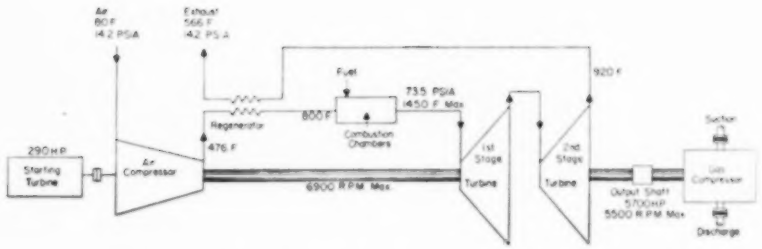
After the gases have passed through both turbines they are still quite hot, normally about 880 F. Some of this heat is saved, as mentioned above, by transferring it in the regenerator to the fresh supply of compressed air heading for the combustion chambers. The transfer of heat takes place as the air flows around hundreds of small pipes through which the hot exhaust gases pass to the atmosphere.

Fuel Regulation-Control

Each turbine has a set of nozzles which convert the pressure energy in the hot gases to velocity energy. It is this velocity energy which then strikes the blades making up the turbine rotors and turns them at high speed. In the case of the load turbine, the nozzles are movable and can be varied to change the amount of conversion of pressure energy to velocity energy.

Two methods of control which help govern the turbine's performance are regulation of the fuel supply and changing position of these variable nozzles, which are

AUTOMATIC CONTROL is the outstanding feature of the installation. In a matter of 15 minutes the unit can be put in service by energizing one master control switch. First Engineer L. C. Woerndel is shown at the main control room operating panel.



Schematic Diagram of the Gas Turbine Compressor

Principal use of gas turbines in the industry has been on long distance pipe lines where high flowing volumes and low compression ratios are needed—where a lot of gas needs to be compressed a little bit. Advantages offered by such a unit include flexibility of speed at full load conditions, low building space requirements, push button station control, low maintenance costs, less operating supervision, less piping vibration and pulsation.

located in the passageway between the first stage turbine and the load turbine. Both conditions are controlled automatically.

Rate of fuel flow into the combustion chambers is governed by a fuel regulator which receives a number of signals that cause it either to increase or decrease fuel. The signals include: station discharge pressure, speed of the load turbine, temperature of turbine exhaust, fuel requirements when starting, and selected speed setting. By adjusting fuel flow, speed of the load turbine can be varied from 2,000 to 5,500 rpm to effectively meet pipe line needs.

When the station is running at full load, the variable nozzles remain in a definite position calculated to provide greatest operating efficiency. However, when the station is handling light loads, there is a close connection between the amount of fuel used and position of the nozzles, which are actuated by an automatic nozzle regulator that is governed by speed of the gas generating set and the exhaust temperature.

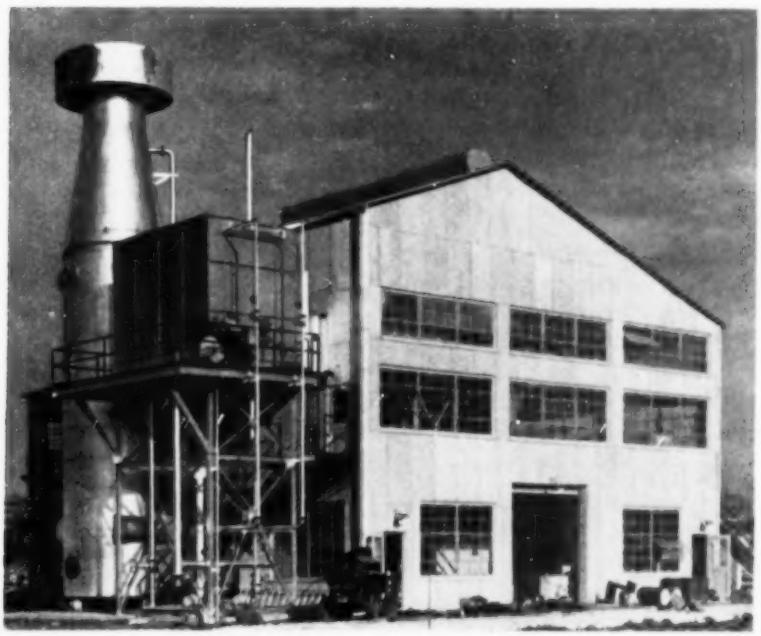
By operating with automatic control of the nozzles, efficiency can be stepped up from several standpoints. Excessive overspeeds in the turbine can be prevented by tripping the nozzle wide open. The amount of fuel can be reduced for light pipe line loads. The turbine will handle better at high inlet air temperature. Required starting power can be reduced. The plant can be run at no load without exceeding the rated speed of the load turbine and without running at excessively high exhaust temperatures.

Overspeed protection is also provided by governors attached to each turbine shaft and operated independently of the normal speed controls. In event of excessive overspeeds in either the first stage turbine or the load turbine, they act automatically to stop the fuel gas, thereby shutting down the entire unit. During normal operation the turbine is protected by many such sensing devices.

Control Room

All controls for starting, operating and stopping the turbine and for regulating station pressures are located in the control room, which is separated from the main engine room by a solid wall fitted with vapor-proof glass panels. An annunciator to warn of abnormal operating conditions is mounted on the control panel in the room. Any irregularity in the control points is flashed to this panel, which rings an alarm and drops a tab indicating the source of the trouble. If it is of serious nature the station will automatically shut

(Continued on page 108)



TURBINE BUILDING, constructed of steel with corrugated asbestos siding, rests on a 30 in. concrete mat, which is supported by concrete composite steel piling driven to a sand strata 130 ft deep. Turbine unit, compressor and control room are all situated 14 ft above ground on the second story level of the building. Ground floor is used for station auxiliaries, exhaust, air and water piping facilities. The 125 ton regenerator, or heat exchanger also rests on 130 ft piling.

PIPING VIBRATION, an ever present problem to varying degrees in all reciprocating stations, is practically nil at Napoleonville, La., despite the existence of a low load bearing soil in the area. This was one of the prime factors considered in selecting a turbine type unit.

FOR extra safety, you can now place light signals or horns at a distance from your Reliance EYE-HYE and have multiple warnings as accurate as the EYE-HYE indication itself.

Electrodes extending into the window unit and calibrating tube complete an electrical circuit at the level of the indicating fluid. A special transformer-relay unit supplies current on an isolated circuit that assures positive, accurate action when boiler water level reaches predetermined low or high level points. The signals or alarms coincide exactly with the reading in the always accur te EYE-HYE.

Two-light or three-light indicators, and /or vibratory horns may be used for the extra away-from-the-board warnings. Increase the safety of your water level control. Write for Bulletin C6 describing EYE-HYE with auxiliary alarms.

THE RELIANCE GAUGE COLUMN COMPANY • 5902 Carnegie Avenue • Cleveland 3, Ohio

Gas Turbine Data

(*Starts on page* 104)

down and by-pass the gas.

The control panel also houses a 48-point temperature recorder, vibration recorder, speed indicator and other necessary devices to operate the turbine.

Station suction and discharge valves and the main line valves can be push button controlled from this room. The station can be isolated from flowing gas and by-passed by pressing a single switch. In event of a large drop in pressure on either the suction or discharge lines, this occurs automatically.

Remote control operation of the various valves is by E.I.M. valve operators, which are actuated by gas from the pipe line and electrically controlled by power from the station batteries.

Gas for starting and operating the turbine is taken from the main line, reduced in pressure and separately measured by orifice meters. When placing the station in operation a single switch is pressed in the control room to initiate the starting sequence. The large turbine is rotated by a small starting turbine operating on pipe line pressure and requiring about 35,000 cu ft of gas at 150 psig to start. It engages the station turbine by means of a clutch operated by air pressure.

The starting turbine brings the gas turbine up to 10% speed, where it is purged for about five minutes to remove all traces of gas, then fired and accelerated to idling speed. As it reaches operating speed the starting turbine is disengaged and shut down. During the starting cycle the lubricating oil and cooling water systems are also energized, and the main gas valves automatically opened. Upon completion of the entire sequence the discharge pressure controller takes over speed control of the turbine and maintains the pre-set output.

When a stopping signal is given, the fuel is automatically shut off, the main suction and discharge valves and the compressor by-pass

(*Continued on page* 111)

Standards and simplification in Virginia plant . .

SHIPPING—On An Incentive Plan

Most shipping foremen worry a lot—schedules, deadlines, tonnage limits, etc. Hence, any effort of management to simplify their work is well received.

By A. BUSH ENOS
Industrial Engineer
Richmond, Virginia

AN Eastern Virginia meat packing plant has improved its shipping operations by putting the department on an incentive plan. Lack of floor space prevents using extensive mechanical equipment—all handling is by chutes, stationary and portable roller conveyors, and hand operated floor trucks. Yet a moderate unit cost is maintained week in and week out.

The plan is similar to many others used in putting shipping on an incentive basis, but it has some features that are interesting if not unique.

The first is the division of the department into work "gangs," which handle shipments for each class of delivery routes. There are day gangs, responsible for (railroad) car routes. Then there are night gangs, some working on local, or "city" truck deliveries, others preparing truck deliveries going to other cities, termed "country" routes. Each is paid bonus (over wages) according to gang production, so that there is considerable rivalry between the groups each week over which one can attain top efficiency. Efficiency rating is denoted by a percentage figure.

Packing Methods

Another feature of the operation is the departure from a previous practice of packing each order within the various plant processing departments. The present practice is to "job-pack" a complete order within the shipping department, after the initial packaging of the product.

A group leader is responsible for each car or truckload shipped. Orders and shipping tickets are forwarded from the selling departments to him separately, usually pre-assembled. He then calls off items to "runners," who tag when necessary and place each package on a portable roller conveyor terminating in the vehicle to be loaded. A checker sees that orders are completely and accurately filled before packages are removed from conveyor to be placed on car or van floor.

Filling orders by "runners" is made possible by assembling stock from manufacturing departments onto the shipping floor. This is done both prior to and during the loading operation.

Briefly stated, and in methods analysis terms, the operation is broken down as follows:

1. Supply stock from plant (processing) departments.
2. "Call" items from order.
3. Fill order—place package on conveyor, and tag.
4. Take package off conveyor—position inside carrier vehicle.
5. Check packages against order.

Up to this point, the plan appears to be a simple one—and is. With some exceptions, it was fairly easy to time study the operations and make standards on a per-package basis. The only drawback—no record was readily available for reporting the number of packages handled. Nor was any on-the-spot package count made. To have done so would have increased the cost of the process. However, weight records *were* kept; and most unit production costs were customarily based on a pound or hundredweight count.

Preparing Standards

And so the problem—how to convert studies made on handling packages, or cartons, to a standard expressed in terms of pounds. Roughly, a typical operation (supply stock) would break down like this (figures used are purely nominal):

1. Get empty floor truck—1.0000 min./per truck.
2. Push truck to storage room—1.5000 min./per truck.
3. Load carton (package) from storage to truck—.1500 min./per carton.
4. Push truckload to shipping floor position—2.5000 min./per truck.

Obviously, a common denominator was needed; and it was logical to select *cartons* as the unit to use. If it were known how many cartons were loaded onto a floor truck, converting readings No. 1, 2, and 4 above to the unit used in No. 3 would be simple.

To discover this, an exhaustive

(*Continued on page* 110)

STUDIES on handling packages, or cartons, were converted to a standard expressed in terms of pounds. Problem was thus simplified into arriving at a per-carton weight.

series of counts were made; and it was found that truckloads would consistently carry a batch of products in cartons of a fairly uniform size and weight common to the department processing the product. For instance, sausage cartons might average 75 to the floor-truckload, smoked meats 50 cartons, fresh meat 35 cartons, etc. Fluctuations would have to vary sharply from average to make more than a few thousandths of a minute in the "per-carton" reading. Thus, the typical example could have been expressed as shown in the table.

Operation	Minutes per Occurrence	Cartons per Occurrence	Minutes per Carton
1. Get truck	1.0000	50	.0200
2. To storage room	1.5000	50	.0300
3. Load carton	.1500	1	.1500
4. To shipping floor	2.5000	50	.0500
		Total minutes per carton—	.2500

The problem is thus simplified into one of arriving at a per-carton weight. Here is how the company did it.

A detailed study of every individual order for each class of truck routes was made separately; also a study on car routes. This study was continuous over certain typical shipping periods, and showed average carton weights for load after load.

Variations from average were negligible; here was a figure which could be used. To illustrate, a time of .2500 minutes per carton divided by, say, a 20 lb weight average meant a standard of .0125 minutes per pound.

After preparing the per-pound standards applying to each shipping route and testing on each labor gang for several weeks, they appeared sound; and it was decided to put them into effect, as production incentives.

Five years after their installation, these basic standards are still in use. Naturally, the industrial engineer has had to check them periodically. In the first place, it was anticipated that there might be seasonal or other fluctuations in those average carton weights. When this was indicated by abnormal variations in gang efficiency reports, new tests were made on the orders handled by that group. If average weight fluctuations were significant, no change was made in the basic per-carton standard—but a new per-pound division was made, adjusting time figures accordingly. (This system has, of course, been explained to all parties concerned).

Another fluctuation occurred, causing somewhat more variation than anticipated. That was in the handling of so-called "combination" packages, i. e., several small packages assembled into a larger carton before placing on loading conveyors. While longer time allowances were made for this type of handling, standards were arrived at by studying the ratio of combination cartons to the regular or prepacked variety and making proper composites. However, due to buying habits among car-route customers, a marked increase occurred in the number of combination packages for car route loads—again reflected in lower production efficiency. Additional studies were made; and ratios readjusted in the standards, to the satisfaction of all concerned.

Though installation of newer handling equipment is expected to improve costs per hundredweight even more, the present method has done much to keep shipping costs under control.

Engineering Data Filing Procedure

An open-ended system allowing you to discard obsolete data without having to revamp indicators.

THE PROBLEM of maintaining filing systems of reference data, detail drawings, magazine tear sheets, technical records, manufacturers' catalogs and such—and co-ordinating them with the systems employed by the company library and other information services—is solved in many cases by adopting a basic classification system like that used by Sweet's Catalog Service.

By this procedure the engineering department does away with the confusion, duplication and conflict that exists between personal, department and company library files. It establishes a pattern for regulating and implementing information.

The manufacturers' listings in Sweet's 1954 Plant Engineering and Product Design Files are divided into seven and four major product classifications, respectively. The sub-classifications in the Plant Engineering File total 36; those in the Product Design File total 23. Yet these simplified divisions of product data embrace nearly every area of engineering interest.

The classifications shown are by no means static. They can be easily adjusted each year to meet ever-changing industrial information requirements.

Within the framework of such a classification system it is helpful to adopt the following system of indexing individual pieces of product literature.

Under each sub-section, arrange the literature in alphabetical sequence by manufacturers' names. A convenient fractional indicator to identify each piece of literature consists of three parts—in the

numerator, the major section number followed by the sub-section letter; in the denominator, the first two letters of the manufacturer's name in upper and lower case. In case two firm names in the same sub-section have the same first two letters, the third letter is added.

DETAIL — GENERAL PLANT ENGINEERING DEPARTMENTS

1. Mechanical Equipment
- a. material handling
- b. vertical transportation
- c. power transmission
- d. pumps and compressors
- e. plate construction, tanks
- f. pipe, fittings, strainers
- g. valves and traps
- h. instruments and controls
- i. lubrication
- j. finishing
- k. production equipment
- l. miscellaneous equipment and supplies

2. Electrical Equipment
- a. distribution
- b. panelboards, motors, controls
- c. power tubes

3. Materials
- a. metals
- b. glass, plastics
- c. masonry
- d. wood and wood preservatives
- e. roofing and siding
- f. gratings, grids, floor plates
- g. flooring, wall covering
- h. masonry, treatments, waterproofing
- i. paints, finishes, protective coatings

4. Thermal Insulation, Sound Control
- a. thermal insulation refractories
- b. sound control, vibration isolation

5. Structural Equipment
- a. structural systems
- b. doors and hardware
- c. skylights, ventilators
- d. partitions, fences, guards

6. Plant Utilities
- a. power generation
- b. water conditioning
- c. air conditioning, heating, refrigeration
- d. lighting
- e. protection

7. Service Equipment, Services
- a. service equipment
- b. services

Gas Turbine Data

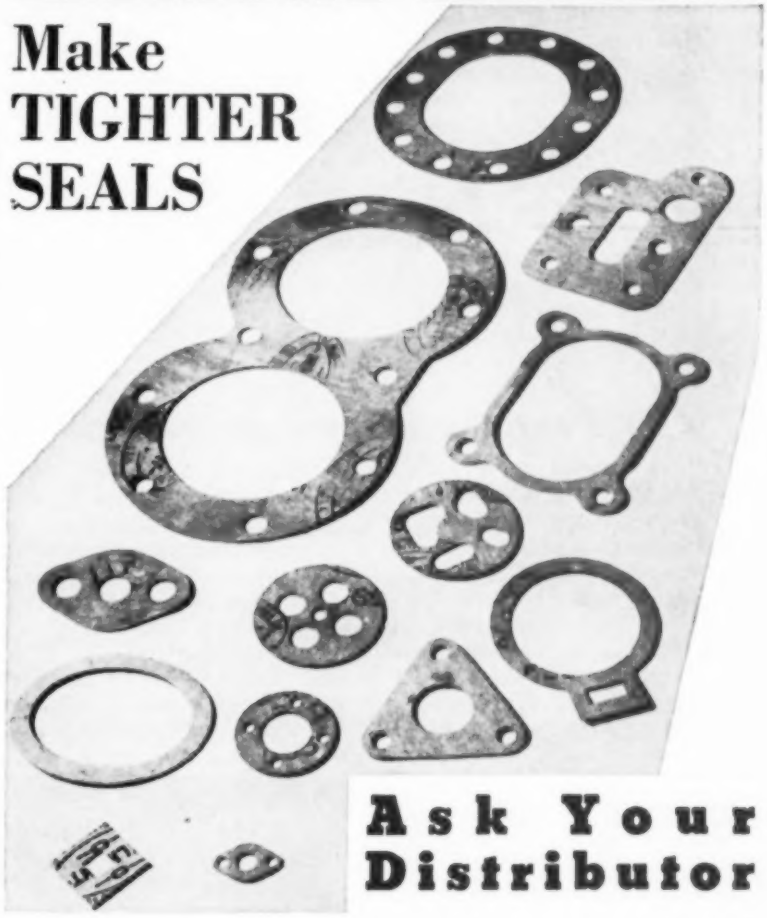
(*Starts on page* 104)

valve and purge valve are opened. The gas compressor turbine shaft will come to rest in approximately 6 to 8 minutes and the air compressor turbine shaft in about 15 minutes. The lubricating oil pump runs for about 30 minutes after the unit stops to keep the bearings cool. Restarting can take place as soon as both shafts come to rest.

Station auxiliaries are either driven direct from the shaft of the turbine, or are electrically powered by purchased alternating current or by direct current from storage batteries. In case of a power failure, a gas engine driven standby generator supplies the minimum alternating current requirements. Battery power is used for some of the turbine auxiliaries and to actuate all the valve operators and automatic controls.

BELMONT GASKETS

Make TIGHTER SEALS



Ask Your Distributor

A recent industrial survey indicated that leaky gaskets cost *MILLIONS OF DOLLARS A YEAR! ONE* leak caused by a faulty gasket took a machine out of service for many days, and the resulting production cost for this ONE idle machine ran into hundreds of dollars an hour. DON'T LET THIS HAPPEN TO YOU!

For *every* joint and surface Sealing Job there's a BELMONT GASKET to give you a tighter, leak-proof seal, and your BELMONT DISTRIBUTOR has the knowledge and precise materials to assure you of uninterrupted production schedules and reduced maintenance. In fact, *any* sealing problem—requiring a molded, formed, extruded, die or lathe cut gasket—can be solved by YOUR BELMONT DISTRIBUTOR.

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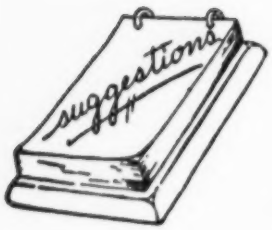


HELPING the *MAN-IN-THE-PLANT*

Ideas..Methods..Gadgets

Coated Abrasive Maintenance Grinding

ADAPTABILITY of coated abrasives to grinding ferrous as well as nonferrous metals and alloys—whether hard or soft—is an indication of their all-round versatility.

Able to remove stock rapidly, yet with cool-cutting characteristics which minimize the burning of tools being ground, coated abrasives reduce labor costs by increasing output per man. The ability to hold close tolerances with the relatively low cost grinding equipment is also an important factor.

Types Available

Coated abrasives are available in the form of rolls, belts, discs, sheets, molded shapes and cartridge rolls. These include abrasives such as flint, emery, silicon carbide, aluminum oxide, garnet, crocus and cork; in particle sizes ranging from six ten-thousandths to one-eighth of an inch, and coated on paper, cloth, fibre and combinations of these materials bonded with glue, resin and varnish.

It is evident from this formidable array of varieties, that a coated abrasive is available to meet the requirements of almost every conceivable maintenance grinding operation.

For a multitude of maintenance applications, however, belts are very frequently used. They are available in grit sizes ranging from 24 to 320 and in width and length sizes to fit portable and bench grinders.

Three typical maintenance grinding applications are illus-

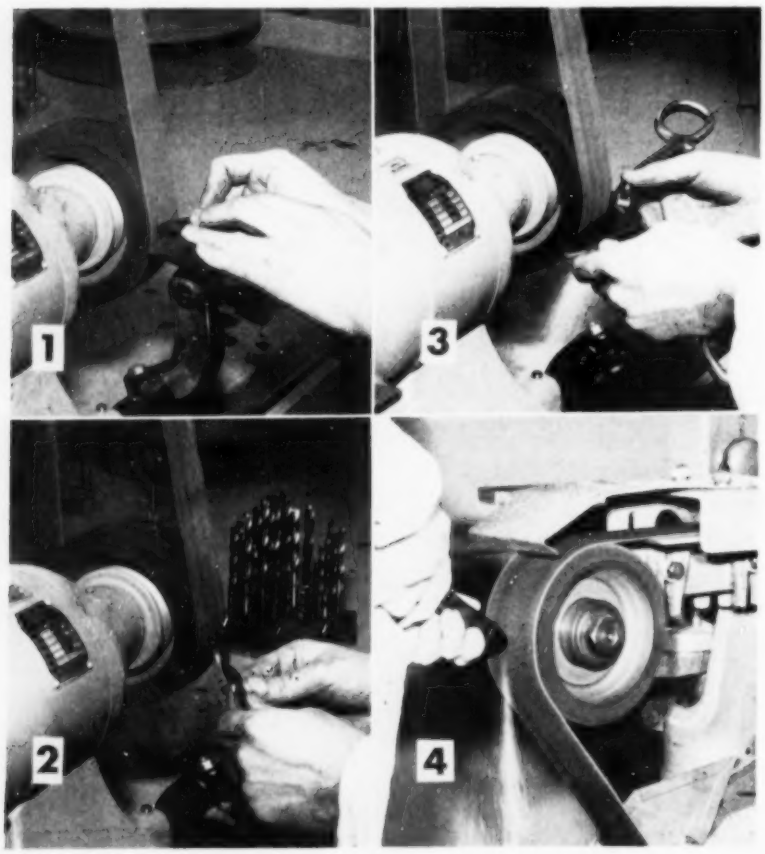


PHOTO 1—Sharpening a high-speed-steel, single-point turning tool on a bench grinder employing a 60-grit, aluminum oxide cloth belt.

PHOTO 2—Sharpening high-speed-steel drills on a bench belt grinder. The cool-cutting characteristics of coated abrasive belts minimize burning of the tools being ground.

PHOTO 3—Coated abrasive belt grinding offers the advantage of a continuous cut over the entire width of work pieces of relatively long section, as in the case of these tin shears.

PHOTO 4—Contact grinding with the Versabelt floor model belt grinder. Possessing all-round utility, the unit provides contact wheel, platen and slack-of-belt principles. Data courtesy W. K. VanOrmer, Manager, Abrasive Engineering Branch, Coated Products Division, The Carborundum Co.

trated. For these applications, a 60-grit, 48 x 2 in. aluminum oxide industrial cloth belt is employed. Belt speed is 5500 sfpm.

Carborundum's new type "61" contact wheel is also used. The serrated rubber contact wheel plays an important part in the success of the belt grinder, particularly as regards increasing production rate and lengthening abrasive belt life.

The spirally-serrated face gives high points for cutting and low points for chip clearance. The serrations have a very narrow land with a straight leading edge and beveled trailing edge which resembles a milling cutter tool, and accounts for the fast cutting rate of the abrasive belt. It also has the faculty of breaking the belt down gradually so that almost all of the abrasive on the belt is utilized, with glazing and loading held to a minimum.

Belts have the further advantage of constant peripheral speed, which permits inexperienced operators to produce good results with ease. Moreover, belts can be changed on the grinder in a matter of a few seconds, reducing downtime.

Since belts are available in a variety of sizes, it is usually possible to select a belt size which will give a continuous cut over the entire width of the work surface or edge—as in the case of the shears in Photo 3.

Another example of the types of belt grinding machine tools available for maintenance work is the Versabelt grinder—Photo 4. This low-cost, multi-purpose machine can be used for all normal kinds of off-hand grinding. The machine can be set up to function vertically, horizontally or at any angle in between, in increments of 15 degrees.

This unusual degree of flexibility permits the Versabelt grinder to be used for a number of belt grinding operations, including tilted platen, off-hand, vertical platen, slack-of-belt and contour grinding. It can be adjusted at the most convenient height for the operator in either standing or sitting positions.

Light, yet rugged and compact, the machine can be moved from one location to another without being disassembled. It operates at 5500 sfpm and uses a 112 in. abrasive belt. This increased length results in greater belt life, thus reducing operating costs.

"Shrink-Fits" With Far-Infrared Units

FOR THE precision job of installing "shrink-fit" parts in aircraft engines, Capital Airlines at Washington Nation Airport has turned to far-infrared radiant heat for precise preheating of engine cylinders on a conveyorized basis. Other important advantages gained in changing from the former gas torch heating method include a 30% increase in assembly production, a saving of 25 man-hours per week, and cleaner, cooler working conditions for employees.

Tunnel Design

The flexible radiant tunnel responsible for these results has infinitely variable control, and is readily adapted to handle several different types of cylinders for engines which Capital overhauls. Tunnel construction consists of six Chromalox (Edwin L. Wiegand Company) electric radiant heaters rated at 3.6 kw each, which are enclosed in an insulated shell and mounted on structural framing over the conveyor line.

OPERATOR adjusts cylinders on conveyor at entrance to far-infrared tunnel. Close-up shows how Chromalox electric radiant heaters are placed to concentrate heat on cylinders.

The heaters concentrate radiant heat on the valve opening areas of each cylinder, while reflective aluminum spacers inserted between the heaters increase radiant effectiveness and help retain convection heat. Far-infrared produced by the Chromalox radiant heater is readily absorbed by the aluminum cylinders. The tunnel accommodates six cylinders at a time continuously.

Correct temperatures for each type of cylinder are obtained by varying the setting of a percentage-type input controller. Maximum setting in any case is 75%. Additional control is provided by a non-indicating regulator which limits ambient temperature at 650 F.

In addition to the operating advantages mentioned so far, Capital has found that the tunnel, which is only 7'8" long and 2'6" wide, saves considerable floor space. The company is well satisfied with the installation and is now constructing an additional one in line with the expansion of their engine overhauling facilities.

Sand Chute Life Increased

THE sand chute at the Anderson Concrete Company, Anderson, South Carolina, has performed successfully with rubber faced steel plate. On this chute, 3/16" steel wore out in 3 to 4 months.

Gates rubber faced steel plate—abrasion resistant rubber vulcanized permanently to sheet steel—has lasted 16 months, over 4 times as long.

As a result of this large increase in service life, the plant has installed rubber faced steel plate on other equipment.

By George A. Lloyd, Anderson Concrete Co., Anderson, S. C.

Ideas . . methods . . gadgets (continued)

Handling New Rope

MOST maintenance men get some practice in the handling of well used cordage which has already developed kinkless habits, but few know exactly what to do with new rope received from the factory.

New rope has a tendency to kink very seriously, making it practically unusable if improperly handled. This is because the strands are made up with opposite twists. These tensions cannot be perfectly balanced in manufacture, no matter how much skill and care are used. Therefore, rope must be worked to reach its maximum usefulness.

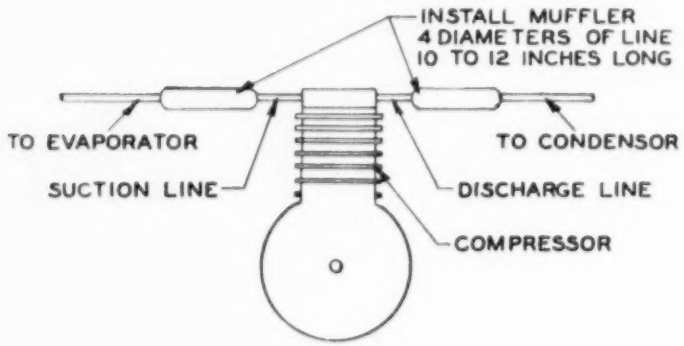
Novices or self-taught men use many devices to hasten the job of getting rid of the kinks — some drag it in the water behind a moving vessel, and claim "a line is no good until it has been thoroughly wet, anyhow." Some structural steel workers hang a line from as high a support as they can get, leaving the lower end free to twist and turn freely until the kinks are eliminated. Either method smacks of the amateur; but when one watches the crew of a salt water sailing vessel stow a coil of new rope, he can feel sure he is learning from experts.

These men know that they can tolerate no slipshod or unskillful rope work—the loss of their vessel or of their own lives may well depend on the proper action of just one rope in an emergency. So some of them handle the job as follows, and years of practice prove the method a good one. It takes very little time or room, and while the new rope can still show improvement by a few hours of service, it is practically free of kinks and can be depended upon.

Taking the rope from the manufacturer's coil, the mate laid a piece of 2x4 down on the deck and then coiled the new line down counter clockwise across it, so at least one side of the heavy coil was held up by the scantling. The coiling continued until the final end of the rope was reached, the pile now being around 6 ft high. Then the final end was passed down through the center of the coil and threaded out under it alongside the 2x4, which had been previously placed to provide a channel for easy passage.

Then the rope was again coiled down in its storage, this time coiled clockwise as is usual with "right lay" rope, and was ready for service. The method will probably look fussy and useless to beginners, but a little experience with a new and kinky rope will soon convince them of the error of their judgment. The method certainly will prove its worth on a fair trial.

By B. H. Munson, La.



Quieting Noisy Compressor Operation

HERE is a method we used for quieting a compressor where the valve action was excessively noisy. Plant maintenance men will find it particularly useful in working on package type air conditioning units. Mufflers (in the particular case illustrated) were used on an old model 5-ton Brunner compressor in a food locker plant. Valve plates would last only from 3 to 4 months. After the installation, valve plate service life was extended over 18 months.

The suction muffler will equalize or tend to steady the flow of gas, thus dampening the valve noises which would otherwise reverberate back into and through the evaporator. The muffler on the discharge side acts as a surge tank and will smooth out the pulsations thereby relieving the hammering of the discharge valve. In addition, a slight rise in over-all efficiency of the compressor can be expected.

The mufflers mentioned are only enlarged sections of the suction and discharge pipes. No internal baffles or other parts were added. Material used for making the enlarged sections should be the same as the suction and discharge tubes. In the case cited, suction and discharge pipes were copper tubing. Silver solder, which has a melting point well above the temperature that might be generated by compressing the gaseous refrigerant, was used in making all the joints.

By George Simon, Phillipsburg, Kan.

$$$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Southern Power & Industry
806 Peachtree St., N.E.
Atlanta 5, Georgia

Crossed-Belt Drives

ONE of our maintenance men had to install some crossed-belt drives. Belts were 3″ to 10″ wide. He asked me the maximum width of belt that could be crossed; the maximum center distances; and the maximum pulley ratios.

There is no formula that meets all conditions of crossed-belt drives, because of the many factors involved. Which pulley is the driver—the small or large one? What are the pulley sizes? Which side is the tight side? Pulley ratio? Quality of belt? Pulley surface?

However, the following is safe for most conditions and is applicable to high grade double leather belts up to 6″ in width: Add the diameters of the pulleys in inches and divide by 10. Add the quotient to 6. Result is the minimum center distance in feet.

For belts that are wider than 6″ multiply the result obtained from the above rule by the width of the belt in inches. Divide by 6. Result is the minimum center distance in feet.

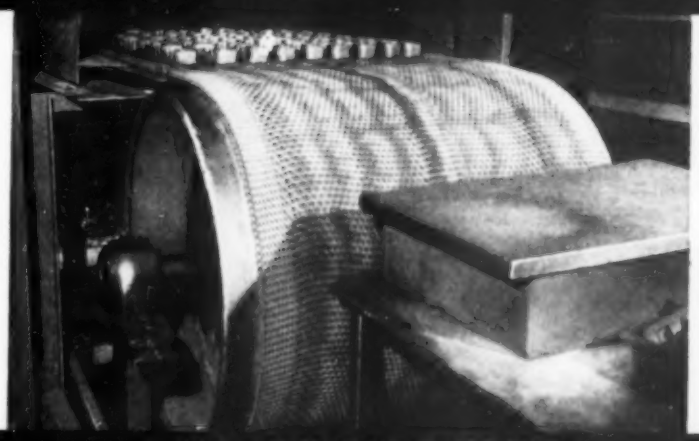
High Ratios Objectionable

The above rules do not apply to pulley ratios that are greater than 6 to 1. In fact, it is better not to exceed 5 to 1. The smaller the ratio the more satisfactory the rules. High ratios are objectionable because the point at which the belt makes the cross is always close to the smaller pulley. And the wider the belt the more serious is this objection, because of the rubbing of the belt against itself.

Installation Guides

It is possible to cross belting 10″ in width but it is necessary that distance between shaft centers be ample and the pulley ratio should not be greater than 3 to 1. Belting 8″ in width is usually regarded as the limit. Some belt engineers regard 6″ belting as the limit. But, as already stated, there is no reason why 10″ belting cannot be crossed where conditions are not severe and where

idea for AUTOMATION



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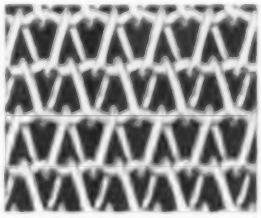
Woven Wire Conveyor Belts

CONTINUOUS BRAZING

Metal products can be heat treated, quenched and cooled in one continuous series of operations on Cambridge belts. All-metal belt is unharmed by temperature, quench oils or sharp-edged, heavy loads. Working in process temperatures from sub-zero to as high as 2100° F. . . . and in dry or highly corrosive conditions . . . you'll find Cambridge Woven Wire Conveyor Belts help provide cost-cutting, automatic production by allowing you to process the work *continuously*. No batch operations, less manual handling in processing metal, food, chemical or ceramic products.

OPEN MESH CONSTRUCTION of belt provides free circulation of process atmospheres for uniform treatment, free drainage of process solutions. Of course, the all-metal construction means lowest maintenance cost.



CAMBRIDGE BELTS are available in any metal or alloy. Thus, the belt recommended for you can be fabricated from the specific material that will give longest belt life under your operating conditions. In addition, Cambridge belts can be woven to any length or width and in a wide variety of weaves and mesh sizes to meet your needs.

FREE REFERENCE MANUAL gives full details on how Cambridge belts can boost output, cut costs by providing continuous, automatic production . . . *automation!* Includes all specifications and details, also metallurgical tables. Write for your copy today! Or, for specific recommendations, call in your Cambridge Field Engineer. He's listed under "Belting-Mechanical" in your classified 'phone book.

The Cambridge Wire Cloth Co.

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Department Y
Cambridge 6, Maryland

OFFICES IN LEADING INDUSTRIAL AREAS

good judgment is exercised. High grade double belting gives better results than single belting, which is the reason why double thickness is usually recommended.

Run the tight side to the top of the smaller pulley wherever practicable regardless of whether the small pulley is the driver or the driven pulley. Best results are obtained when the smaller pulley is the driver. Belt pliability is of considerable importance. Use a high grade flexible belt. It is obvious that a stiff belt cannot be twisted and crossed as readily as a flexible belt and is likely to do more rubbing at the "cross."

There is no definite maximum center distance for crossed belts. It is possible to run a crossed belt at as great a center distance as with an open belt. A crossed belt will pull a greater load without slipping, but nevertheless should not be loaded more heavily than an open belt.

By Nelson Roeller, Oklahoma.

Fastening Studs With Powder Actuated Tools

COSTS of fastening drive pins or threaded studs into steel or cement have been cut in half in maintenance operations at the big Glenn L. Martin Co. plant in Baltimore through the use of powder-actuated tools and fasteners, according to Fred W. Wilcox, plant engineer.

"Ramset tools reduce the time of drilling and anchoring studs and pins at least 70%," Mr. Wilcox said.

"Since one of the big problems in maintenance work is to keep from under the production people's feet, this time saving factor is very important. We keep 10 tools busy around the clock."

More than 30,000 fasteners were used by Martin maintenance people last year on jobs as widely varied as installing steel rails for flying boat assembly lines to erecting a wooden "security" fence around an area where highly classified government work is being done.

One of the big advantages of the powder-actuated tool in maintenance work is its portability, according to Adam Scepaniak, maintenance superintendent.

"We recently checked tool crib records on one tool and found that it had been used in four widely separated areas in one eight-hour shift," said Scepaniak.

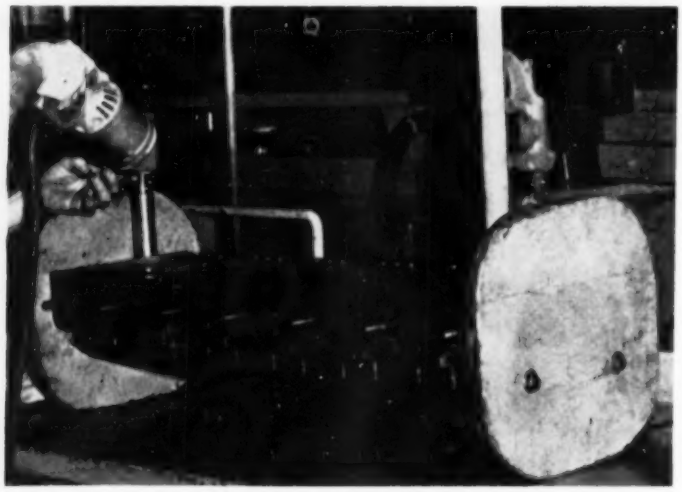
"When you have 5,500,000 sq ft of floor space to maintain, that's important. Take a job where we want to fasten a couple of angle irons to a steel I-beam. Instead of carting an electric drill to the job and measuring the piece and the beam, we simply set the angle iron in place and fasten it with Ramset fasteners and charges."

Fence Construction

As an example of the way the powder-actuated system is used in Martin's daily maintenance operation, Scepaniak points to the "security" fence, 950 ft long, which according to Navy regulations had to be erected around a certain production area.

"It was up to us to get that fence built as soon as possible," he said. "Using a powder-actuated tool one man fastened the base of the fence to the cement in a couple of hours, a job which would normally take three men a shift and a half. Using the men who would have been setting the base along with other carpenters we had the fence up in a day and a half. In other words, the entire job was done in approximately the same time it would formerly have taken to fasten the base."

Like most companies today Martin is constantly seeking ways to increase working space. During the past year several thousand feet of extra floor space have been



Maintenance Positioner

THE above arrangement, employed in the Louisville, Ky., shops of a railroad, can be adopted for many general repair procedures where easy positioning of moderately heavy items is necessary in maintenance work.

Here, heads on overhead valve engines are easily handled on a work bench for grinding valve seats, cleaning and other work. Two end pieces are made of wood and bolted to the ends of the block. The block can then be rotated without lifting. It will remain steady on any of the four sides, but the corners of the wood blocks are rounded for easy turning.

By L. H. Houck, Mo.

In another application, more than 5,000 ft of steel rails were fastened with the Ramset powder-actuated tools. Rails support work fixtures on which P5M Martin flying boats ride as they are moved along the assembly line.

added through the construction of balconies.

The 3" planking on the floor of the balconies was fastened with six-inch studs driven with a Ramset fastener through a 2x4 into $^3/_8$" steel supporting H-beams.

"The powder-driven fasteners eliminated three drilling operations which we would have to have done before bolts would be set to secure the planking," Scepaniak says.

$$$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

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Equipment . . Supplies . . Methods

Inductor Excitation System for Generators

F-1 ALLIS-CHALMERS MANUFACTURING COMPANY, Box 512, Milwaukee 1, Wis., has developed an entirely new exciter system available as original equipment with turbine-generator units or for modernization of older generators.

In the new system, brushes and commutator of the conventional exciter and all rotating windings have been eliminated by substituting an inductor alternator for the usual d-c machine.

Power for excitation is generated at high frequency by the inductor alternator and then changed by a bank of selenium rectifiers to direct current for exciting the main generator field and the exciter series field. The inductor alternator exciter is under the control of magnetic amplifiers through a circuit sensitive to the main generator terminal voltage.

The inductor generator has inherently high reactance and is especially sensitive to lagging - power - factor loads. The control signal to the magnetic amplifier is obtained from potential transformers on the main generator terminals through a comparator circuit and a magnetic preamplifier. Output of the main generator is controlled with a high degree of amplification by using the magnetic amplifier as a variable-reactance load.

Because the exciter has in effect no time constant of its own, the speed of response as a factor delaying restoration of voltage is governed mainly by the very short time constant of the magnetic amplifiers.

Perhaps the most interesting advantages of the development are that two of today's major causes of steam turbine generator outages, commutator maintenance and brush replacement, will be eliminated. The rotating element of the new a-c exciter is adaptable to overhung mounting on most 3600 rpm generators, in which case couplings, gears and extra bearings are eliminated. And other than the inductor generator, only static components are used.

When compared with the conventional d-c exciter-regulator system, the new exciter is expected to virtually eliminate maintenance requirements while providing superior reliability and performance.

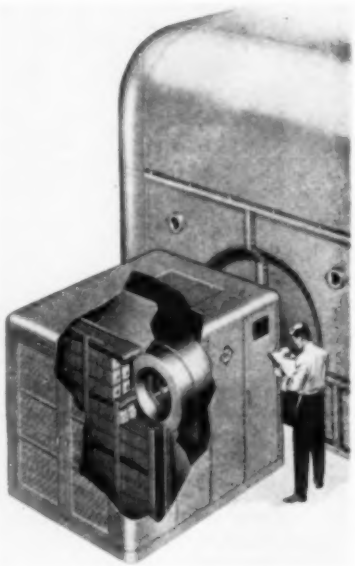
The first of these new exciter systems will be installed soon by Allis-Chalmers on a 43,750 kva, 3600 rpm machine at Iowa Power & Light Company, Des Moines.

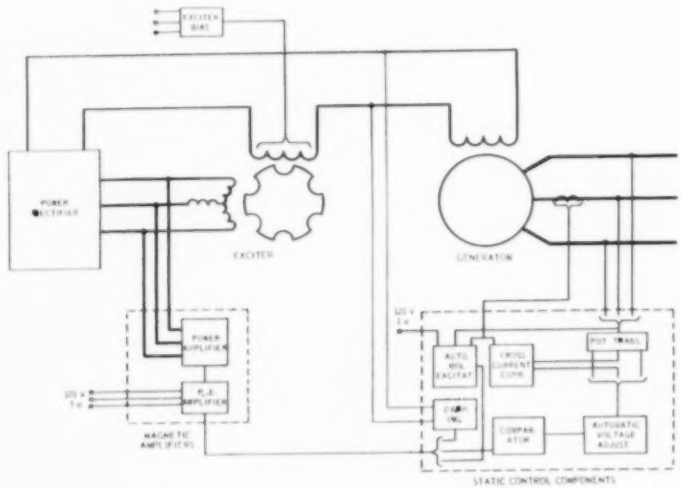
Free additional information is available to readers of SP&I. Circle the item code number on one of the reader service post cards provided on pages 17-18.

Cutaway drawing, right, shows how the new Allis-Chalmers exciter system will look when installed at Iowa Power & Light Company. One of the doors leads to compartment housing the inductor generator with its direct mounted centrifugal fan and the slip rings of the main generator. The other door leads to the selenium rectifier bank.

Heart of the A-C excitation system is the 360 cycle inductor generator which has no rotating windings, commutator or slip rings. As the fluted rotor in the inductor generator rotates, reluctance in the flux path between stator pole faces varies. This variation induces a 360 cycle current in the alternating current exciter field.

The block diagram, below, shows major components in same relative position as in the cutaway drawing. Static control components (lower right) are identical to static components used with the "Regulex" rotating amplifier system of voltage regulation. The magnetic amplifiers (lower left) replace the rotating amplifiers of the "Regulex" voltage control system.





Exhaust Silencers

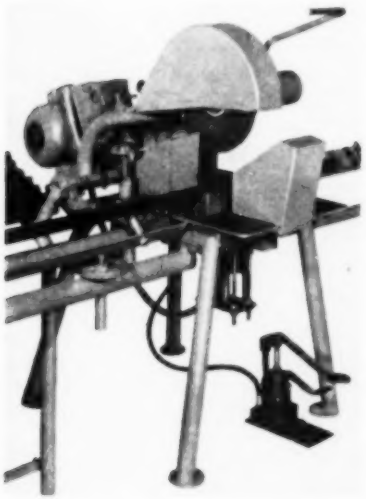
F-2 BURGESS-MANNING COMPANY, Libertyville, Ill., has developed a new line of high velocity steam and air exhaust silencers, designed for noise control in critical and non-critical areas, known as Series "ADS" Acoustic Discharge Silencers.

They are designed to eliminate high and low frequency noises caused by high velocity discharge from steam and air devices. The new silencers operate on the patented Burgess-Manning snubbing principle and employ especially designed acoustic reactance chambers plus special sound absorbing material.

They are for use on steam vents, steam safety valves, hogging jets, gas turbines, air nozzles, evacuating ejectors and similar devices discharging high velocity steam and air into the atmosphere.

Abrasive Cut-Off Saw

F-3 WALLACE SUPPLIES MANUFACTURING COMPANY, 1300 Diversey Parkway, Chicago 14, Ill., has announced a new, versatile and low-cost abrasive cut-off saw, which permits fast, square and practically burr-free cuts of tubular sections up to 4½ in. od or equivalent relieved shapes and solids up to 3 in. diameter.



Abrasive wheel mounted on ball bearing spindle maintains perfect alignment. Unit is powered by 7½ hp motor, with interchangeable v-belt pulleys to drive the 16 in. cutting wheel. Wheel is quickly changeable in its swinging type guard. Tubular steel frame anchors it to the floor. Optional equipment is available to meet various plant requirements.

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Complete information on LOCK-WELD casters is contained in Bulletin 23-33, free on request.

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new equipment (continued)

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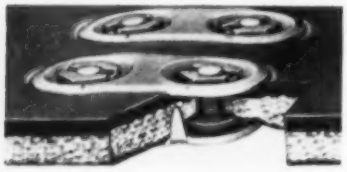
Conveyor Belt Fastener

F-4 FLEXIBLE STEEL LACING CO., 4607 Lexington St., Chicago 44, Ill., has developed a new belt fastener for joining conveyor belts in foundries or wherever scrapers and plows are used on belts conveying sand, clay, gumbo, tacky materials, fertilizers, and wet fines.



These scraper plates, as they are called by the manufacturer, make the same strong, tight-butt joints as standard Flexco belt fasteners. The top plates are beveled at both ends, however, so that scrapers will readily ride over them. In addition, the protrusion above the belt is held to a minimum. The result is less wear on scrapers and improved cleaning of belt.

They are made in one size for joining the most popular size belts 5/16 in. to ½ in. in thickness, with not more than 500 ft centers.

Nonclogging Open-Mesh Abrasive Material

F-5 THE CARBORUNDUM COMPANY, Niagara Falls, N. Y., is now offering "Sand Screen," a new nonclogging open-mesh abrasive material, designed especially for sanding operations where loading or glazing is a problem.

The new sanding, screen-like abrasive is coated uniformly on both sides, with silicon carbide grain. Its open-mesh construction reduces loading to a minimum, by permitting sanding residue to flow freely through the numerous openings. The material can be used on both sides, since it is now possible to retain the sharpness of the abrasive grain on both sides.

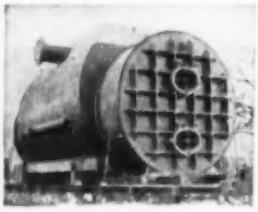
Sand Screen comes in full sheets, cut sheets and discs in grit sizes of 180 and finer. It can also be furnished in standard 50 yard rolls up to 18 in. wide.

Carborundum's Sand Screen can be used wet or dry, for both machine and hand sanding operations.

Vacuum Indicator-Controller

F-6 HASTINGS INSTRUMENT COMPANY, INC., Hampton 11, Va., announces a new vacuum indicator-controller, which automatically maintains a vacuum system in any pre-set range between 1 and 1000 microns of mercury.

CHECK ✓ WITH CONSECO



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The new unit provides upper and lower limit control and automatic reset. After user sets contacts for limits required, indicator-controller provides stable, fully automatic means of controlling vacuum at desired level.

Typical applications in industrial processes include controlling vacuum pump to maintain vacuum within given limits. Unit may also be used to operate alarm when vacuum moves to either upper or lower limit.

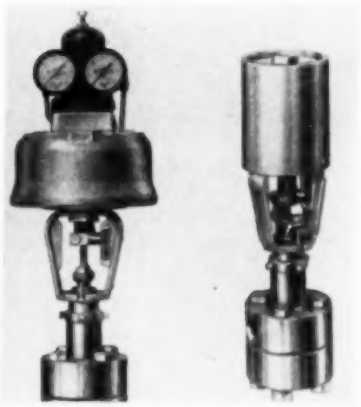
Instrument utilizes gauge tubes with noble metal thermocouples and nickel-plated housing, which afford freedom from outgassing and system contamination. Gauge tubes not affected by release to atmospheric pressure or changes in ambient temperature.

High Pressure Valves

F-7 THE ANNIN COMPANY, 6570 E. Telegraph Road, Los Angeles, Calif., announces a new line of valves for pressures to 6000 psi and temperatures to 900 F.

Pictured are Domotor operated, and cylinder operated valves. Also available are manually operated valves.

Valves are furnished in sizes ½ in. and ¾ in. in a wide selection of body and trim materials, in both offset globe and angle bodies. A companion line suitable for inlet pressures to 10,000 psi is also in production.



Annin's Domotor operated and cylinder operated valves.

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new equipment (continued)

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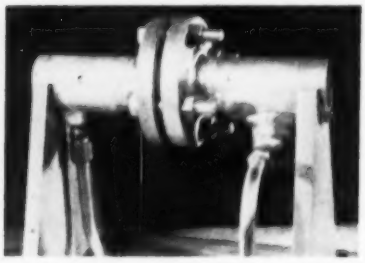


Extruded Steam Traced Aluminum Pipe Design

F-8 ALUMINUM COMPANY OF AMERICA, Pittsburgh 19, Pa., is now offering users of steam traced piping a totally new solution to their equipment problems in "Unitrace," an integrally extruded steam traced aluminum pipe.

Unitrace is the result of joint engineering efforts by Alcoa and Hercules Powder Company to find a new method of applying heat to product piping. Piping users who handle sluggish chemicals such as tar and pitch or tricky solutions such as ammonium nitrate need heated lines to prevent their products from solidifying or crystallizing in the line. In contrast to normal methods of heating lines by using an external steam jacket or steam tube to apply the necessary heat, Unitrace is so produced that the steam line is an integral part of the pipe.

Extruded as a single unit from

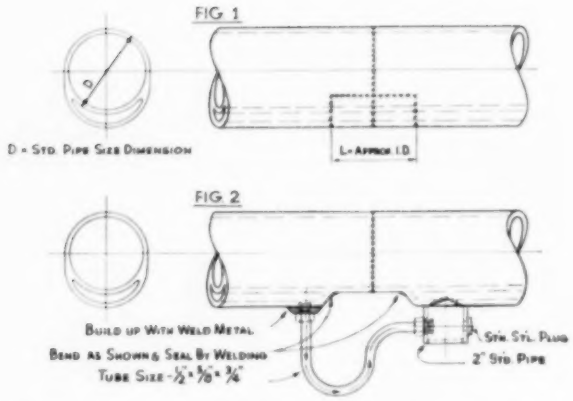
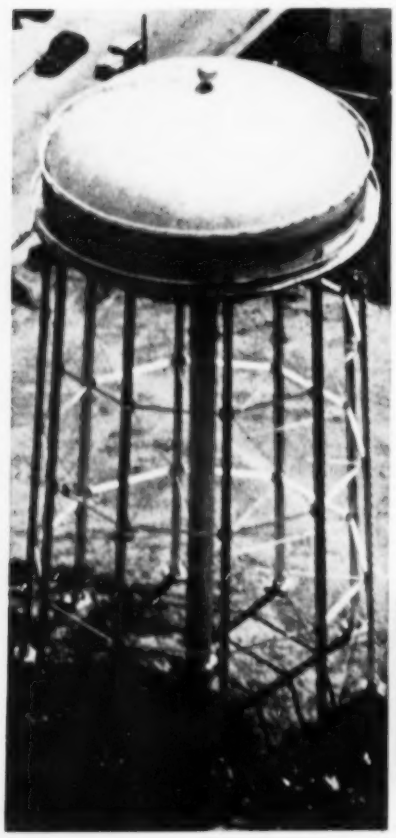


FIG. 1
D = Std. Pipe Size Dimension
L = Approx I.D.
FIG. 2
Build up With Weld Metal
Bend As Shown & Seal By Welding
Tube Size - ½" x ⅝" x ¾"
Stn. Stl. Plug
2" Std. Pipe

Here are some possible methods of joining Unitrace — Alcoa's solution to the problem of applying heat to product piping. Fig. 1 shows welding without use of pipe fittings or jumpers. Fig. 2 shows the use of jumpers for adjacent lengths of pipe, joined without fittings. Technique shown in the photo would be most valuable where joint is subject to periodic removal. Steam line at the joint has been welded shut; welding fittings have been installed. Alcoa Utilitube jumper is used to carry steam across the joint.



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NEWNAN, GEORGIA

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TOWERS • BINS • STANDPIPES

Alcoa 3S-F aluminum alloy, the new product is slightly oval in cross section because of the crescent-shaped steam passage adjacent to the product line.

Pre-formed insulation will fit Unitrace. In the case of the 2" pipe, the new product is designed so that insulation for 2½" standard pipe will form naturally. When insulation is used, a smaller size can be used than with the older steam-jacketed piping. But because of improved efficiency, thermal insulation will be unnecessary in many cases, particularly where set quantities of process steam are allocated for tracing purposes.

Winch-Hoist for Corrosive Conditions

F-9 THE LUG-ALL COMPANY, Wynnewood 59, Pa., has introduced a new 8¾ lb winch-hoist for use in chemical plants, and under conditions where rust and corrosion normally shorten the life of hoists and other metal tools.

The new model has a 133 strand stainless steel, pre-formed aircraft cable. The frame is aluminum alloy. All aluminum parts are anodized.

The winch-hoist lifts, lowers or pulls 1½ ton. When used with single cable, it lifts, lowers or pulls ¾ ton a distance of 10 ft. It can be operated forward, reverse or in free-wheeling, the latter under "no load" conditions. Double interlocking pawls positively hold the load—there are no brakes to slip. It comes complete with three swivel hooks and built-in pulley block, which enables the user to work around corners and in as little as 10 inches headroom.

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Subalox is a complete paint system, so easy and economical to use that a single coat gives an excellent and lasting job. Can be applied by customary methods, but for most satisfactory application we recommend floor brooms.

Subalox is based on a heavy collodial lead pigment which gives excellent rust protection and limits spattering when applied to wire mesh.

Subalox is available in a variety of colors—the most popular being the metallics used to simulate the appearance of galvanizing. Old fences can be given a "new look" which can be easily maintained with a minimum of time, labor and material cost.

Detailed instructions are contained in "SIMPLIFIED FENCE PAINTING"—yours for the asking.

Subox Inc.

6 Fairmount Plant, Hackensack, N. J.

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

Rotary Union Design Features Field Repair

F-10 PERFECTING SERVICE COMPANY, 332 Atando Ave., Charlotte 6, N. C., announces new design of their patented product, the "Rotary Union," a revolving sealing connection between a stationary supply pipe and a revolving machine cylinder, roll or drum.

Low friction ball bearing and mechanical seal construction reduces wear and power consumption.

This new design incorporates field repair of the precision mechanical seal. Conversion field repair cartridges are available for the former factory sealed units now in service. Repairs and conversion can be made in a few minutes with ordinary tools. Factory repair and converting service will be maintained to provide service to those who prefer it. The new construction applies to all standard Rotary Unions ¼" through 2" pipe sizes, for use on steam, water, air, gas or oil applications up to 250 psi.

Further information may be had by contacting the company's factory engineers at their regional offices or circle the above code number for a copy of Bulletin No. 700.

High Temperature Thread Compound

F-11 CRANE PACKING COMPANY, 1800 Cuyler Ave., Chicago 13, Ill., has developed a new high temperature thread compound that protects against the welding action of threaded connections subjected to prolonged exposure to extreme heat.

Known as "Thred-Gard" it is said to eliminate seizing and galling at operating temperatures up to 1200 F. The compound is non-hardening and acts as a lubricant to allow easy disassembly of threaded connections, even after lengthy service under the most severe conditions. Not only is dismantling time greatly reduced, but damage to stud, bolt, pipe joint and plug threads is prevented, thus permitting their re-use. By reducing wrench torque, Thred-Gard allows fittings to be drawn up to a greater degree of tightness without undue stress or strain.

Heavy Duty Power Sweeper

F-12 MODERN MANUFACTURING COMPANY, 160 N. Fair Oaks Ave., Pasadena 1, Calif., is offering a heavy duty power sweeper, built in 36 and 48 in., models, with a completely full floating brush reel, which automatically adjusts it to the floor contour.

Dust from the wall brush is con-

Industrial PUSH-TYPE CRANES

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Atlanta, Jacksonville, Houston, Chattanooga, Birmingham, New Orleans, Mobile, Nashville, Knoxville, Memphis, Shreveport, Dallas, San Antonio, Tulsa, Oklahoma City, Tampa, Miami

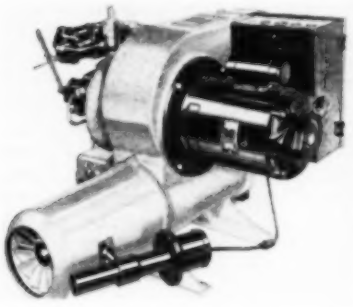
Write for Name of Nearest Agent

trolled and sucked into the sweeper itself, instead of rising in front of the sweeper.

Another feature is auto type steering, with foot pedal controls. Heavy welded steel construction throughout insures long life. It is powered by a 4-cycle, air-cooled engine.

Heating Flexibility With New Burner Design

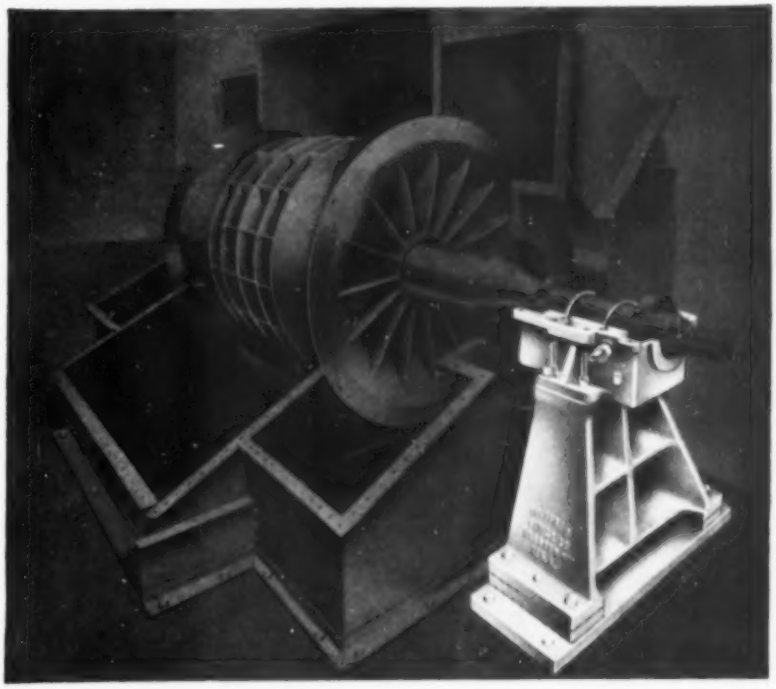
F-13 CLEAVER-BROOKS COMPANY, 326 E. Keefe Ave., Milwaukee 12, Wis., has introduced the new "4" Hev-E-Oil Burner with 35% increase in capacity to make it adaptable to a wider range of heating conditions.



The new model not only provides greater heating flexibility, but incorporates new features which assure increased fuel savings, less maintenance, and simplified installation. Like other models in the line, it is a low pressure, air-atomizing type burner.

The new burner is a complete "package," ready to be set into a boiler or heating plant. It is completely wired, ready for service lines. Automatic controls are connected and pre-tested. No front plates, secondary air or checker work hearth is needed. All primary and secondary air is furnished by the burner. An oil metering pump accurately measures the correct amount of oil for any given operating condition. Complete accessibility of all components assures easy servicing and cleaning.

HOW A BEARING
HELPS PRODUCE CHEAPER POWER



. . . in "Buffalo" Induced Draft Fans

In the punishing induced draft job, every part of the fan that contributes to longer life and freedom from troubles, is helping to cut your power-production costs.

The "Buffalo" water-cooled self-aligning bearing is built to stand heat and continuous, extremely heavy load. The sole plate, pedestal and bearing housing are oversize and completely rigid. Both bearing liner halves are water-cooled. The oil reservoir is extra-large. The self-aligning water-cooled liners are easily removable for servicing operations, without disturbing pedestal, shaft or rotor.

In fact, all parts of "Buffalo" Draft Fans are of equally sturdy, accessible construction—housings, shafts and rotors. This construction is not cheap; it is in line with the "Buffalo" "Q" Factor* which in installation after installation has saved users money through added years of performance on the job. For further information, write today for Bulletin 5750.

"Buffalo"

*The "Q" Factor — The built-in Quality which provides trouble-free satisfaction and long life.

BUFFALO FORGE COMPANY
540 BROADWAY BUFFALO, N. Y.
Publishers of "Fan Engineering" Handbook
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.
Sales Representatives in all Principal Cities

VENTILATING FORCED DRAFT AIR CLEANING COOLING AIR TEMPERING HEATING INDUCED DRAFT PRESSURE BLOWING EXHAUSTING

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

Steel-Clad Floors

F-14 THE FLASH-STONE COMPANY, 3723 Pulaski Ave., Philadelphia 40, Pa., has announced a new industrial floor, named Ancor.

Heavy-gauge rolled steel plates provide a hard abrasion-resistant surface to Ancor Steel-Clad Floors that stands up under the severest kind of industrial usages. Buckling, curling, cracking, and noise, characteristic of many types of metal floor, is completely eliminated. Each plate, embedded in concrete, is held firmly in place with twenty-five surface anchors in each square foot and twenty-eight edge anchors to prevent movement in either a vertical or horizontal direction.

Another advantage is the combination of thirty-one smooth concrete islands per square foot. These islands provide a safe, quiet traction pattern in the flat surface and eliminate the need for corrugations or embossing, which cause a clattering noise and often lead to spillage.

Can be easily installed over wood, new or old concrete or in place of worn brick or wood blocks.

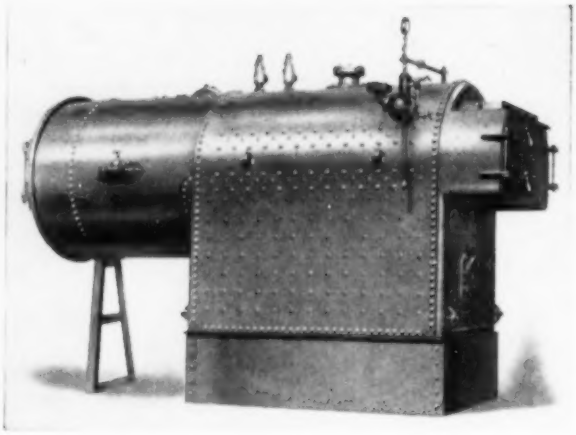
The floors are an ideal protection in foundries, machine shops, metalworking, oil refining, paper and paper products, etc., as well as in those industries where completely sanitary conditions are necessary such as baking, brewing, confectionery, dairy products and food processing.

Electric Wire Rope Hoist

F-15 THE HOIST & CRANE DIVISION OF ROBBINS & MYERS, INC., Springfield, Ohio, has announced its completely new Type J-3 electric wire rope hoist.

Available with either two-speed or single speed push button magnetic control, the hoist has a rated capacity of two tons. It is powered by a 2 hp totally enclosed ball bearing motor specifically designed for hoist duty. The hoist is equipped with 2 parts of ⅜-in cable 6 x 37 reeving. It has an 18 ft lift without overwind;

POWER
with POWER *to spare*



A NEW DOUBLE PASS ALL-PURPOSE
INDUSTRIAL AND HEATING BOILER

SOUTHERN MADE FOR SOUTHERN TRADE

Made in sizes from 44 H.P. to 153 H.P. S.B.I. rating with pressure to 150 lbs. Designed for coal, gas or oil firing, the New Lucey Double Pass Boiler can be furnished complete as a package unit.

This boiler is in addition to our regular line of single pass fire box boilers which we have been making since 1918.

WRITE FOR BULLETIN NO. 153 FOR COMPLETE SPECIFICATIONS

LUCEY BOILER
AND MANUFACTURING CORPORATION

CHATTANOOGA, TENNESSEE
1614 CHESTNUT ST. CHATTANOOGA
1312 STERLING BLDG. HOUSTON, TEXAS

overwinding allows a 25 ft lift. Upper and lower limit switches prevent overtravel of the hook block in either direction. The hoist frame is a single unit casting of high strength aluminum alloy.

A magnetic, disc-type motor brake automatically opens when the hoist starts and closes instantly when the current is shut off. The hoist also incorporates a Weston-type load brake with ample area to keep heating within safe limits. Operating in an oil bath, this brake features a non-reversing clutch. The unit is available with plain, hand geared, or motor driven trolley to meet the needs of any application.

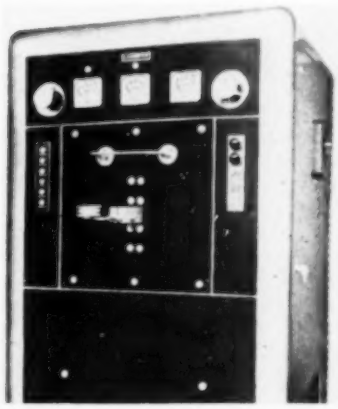
High Frequency Induction Heater

F-16 LINDBERG ENGINEERING COMPANY, 2450 W. Hubbard St., Chicago, Ill., is offering a redesigned 5 kw output high frequency induction heating unit for soldering, brazing and light heat treating applications.

The basic redesign incorporates a heavier sheet steel cabinet. Interior steel partitions are provided to isolate oscillator, power and control components which are accessible for inspection through large access doors. Indicating lamps have been relocated to the cabinet front for easier observation and convenience.

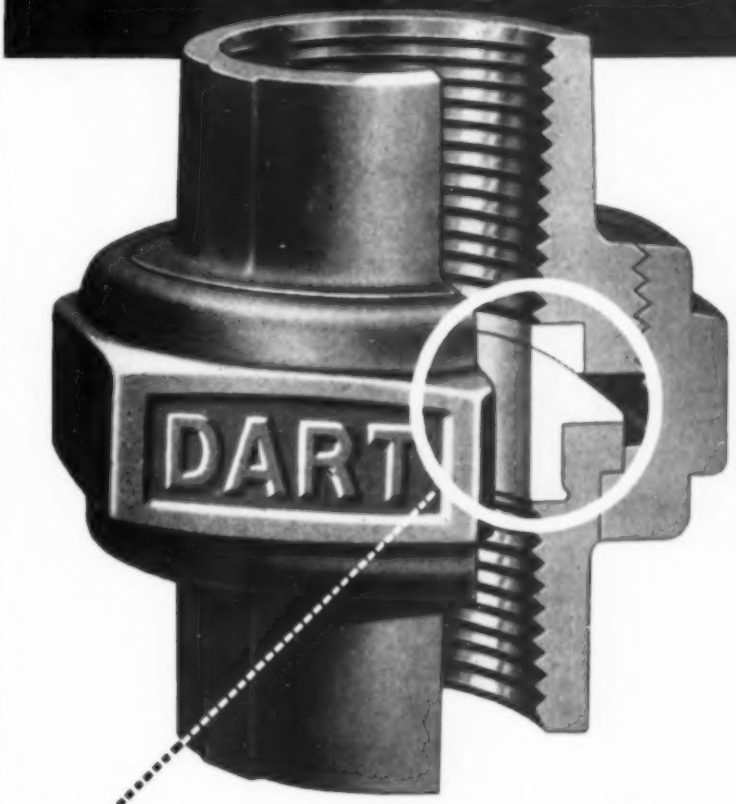
The temperature controlled water cooling system incorporates molded porcelain water coils to form insulating water columns. An electrical interlock system prevents the application of power when cooling water is not flowing.

Industrial type tubes are provided with constant voltage transformers to maintain proper tube filament voltage values regardless of line voltage fluctuations.



Lindberg's redesigned 5 kw induction heating unit.

Lick Leaks
with DART Drop-Tight Unions



This True Ball Joint Makes the Difference

QUICK FACTS

- Leakproof because precision-machined to a true ball joint and spherically ground
- Extra wide seats of bronze alloy that resist pitting and corrosion
- Heavy shoulders (Take severe wrenching in stride)
- Nut and Body Practically Indestructible (They are of air-refined, high test malleable iron)

If you *use* Darts, you make a good decision

DART
UNIONS
DART UNION COMPANY • PROVIDENCE 5, RHODE ISLAND
The Fairbanks Co. — Distributors: Boston • New York • Pittsburgh • Rome, Ga.

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

"E" Frame Circuit Breaker

F-17 I-T-E CIRCUIT BREAKER CO., 19th and Hamilton Sts., Philadelphia 30, Pa., announces the new "E" frame circuit breaker which handles up to 100 amp capacity, for use in panelboard, switchboards, load centers, and all types of individual enclosures.

The compact design provides ample bussing space to accommodate required copper bus. Enlarged pole spacings are engineered into breaker case. Solderless pressure-type terminals are easily accessible.

The new "E" frame is a circuit breaker with quick-make, quick-break contact action. Thermal-magnetic tripping gives protection against overloads and short circuits. On manual or automatic operation, common trip feature opens all contacts simultaneously whenever an overcurrent on any one pole occurs. "Trip-free" handle mechanism prevents breaker from being closed against faults. Three-position handle visually indicates on, off, and tripped positions.

The breaker is available in ratings from 15 to 100 amp; 1 pole, 125 volt a-c, d-c; 2 and 3 pole, 250 volt a-c, 125/250 volt d-c; 5,000 amp interrupting.

Soldering Tool

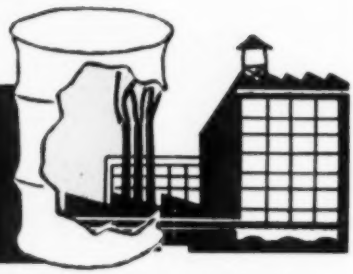
F-18 THE STARK MANUFACTURING COMPANY, Tuscaloosa, Alabama, has recently announced its Model 101 Solder-Quik, designed for light, fast soldering on small work.

The tool is especially recommended for radio and television assembly and repair, typewriter service, electric motor repair and similar operations involving small metal parts. It operates from regular 110 volt a-c line through a step-down transformer.

Soldering heat is obtained at the tip of the Solder-Quik by passing low voltage current through a small area of the work by means of two long-life carbon electrodes. Six heat ranges are available through a simple plug-in feature.

SIMPLIFY and SAVE
on lubricating work with

ALBANY
PRESSUREGREASE
Universal



Hundreds of plants now use this Improved All-Purpose Lubricant for:

Albany Pressuregrease Universal takes the place of four or more separate greases used heretofore . . . cuts down inventory and calls for only one grease gun . . . speeds up lubrication work and saves you money.
Engineers like the way Albany Pressuregrease Universal clings to metal at all temperatures. Its high resistance to moisture prevents rust. Assures cleaner floors because it will not run off at high temperatures or high speeds. Ask for it at your mill supply house.

1. Regular Pressure Grease
2. Ball and Roller Bearing Grease
3. Water Pump Grease
4. Universal Grease and for many other types of equipment

ADAM COOK'S SONS, INC.
LINDEN, NEW JERSEY

FREE:
Send today for helpful copy of Albany Recommendation Chart

***Albany* Lubrication Products**

Southern Representatives: E. E. McCARTHY, 1312 Poinsetta Ave., Orlando, Fla.
J. H. MENGE CO., 932 Nat'l Bank of Commerce, New Orleans, La.

Flanged Milling Machine Vise With Swivel Base

F-19 THE CHICAGO TOOL AND ENGINEERING CO., 8383 S. Chicago Ave., Chicago 17, Ill., recently announced the addition of a new model to the Palmgren line of machine vises for heavy duty service, such as milling, drilling, grinding and other machine operatons which require a rugged holding device.

The No. 60B vise is provided with flanges for clamping down to the machine table and may be used with or without the 360° graduated swivel base. The swivel base is equipped with two bolt lugs for clamping to the machine and is also furnished with two 11/16 in. keys and screws to fit machine table slots.

Versatile Grinding Tool

F-20 THE CARBORUNDUM COMPANY, Niagara Falls, N. Y., has introduced a new grinding tool for the maintenance department, for rough grinding, weld removal, cut-off and slotting operations, for ferrous and nonferrous metals and nonmetallics.

The new Carboflex depressed center wheel combines aggressive cutting action with extreme high strength and resistance to cracking. The new glass-fiber reinforced resin bond wheel provides efficient operation with maximum safety.

Smoothing a weld on a repaired section of a factory lift truck with a Carboflex depressed-center wheel. Numerous maintenance and production jobs can be performed with this glass-fiber-reinforced resin bond wheel.

Rotor revolves on this exclusive case-hardened hollow-steel shaft forming a virtually wear-proof bearing.

Will it last forever?...*we don't know, yet!*

The stationary hollow steel shaft, *exclusive* in Emerson-Electric 12" and 16" oscillating fans, is one of the main reasons why you can find these fans still "blowing strong" years beyond their 5-year guarantee.

The unique single bearing formed by the case-hardened steel of this shaft and the porous cast-iron of the rotor core is the secret to such long life: with "forced feed" lubrication the surfaces of both acquire a fine glaze, like plated metal, which makes practically an ever-lasting bearing.

As a result, many of these fans are still in service after 25, 30 and even 40 years, making Emerson-Electric oscillators by far your best buy on cost-per-year basis.

THE EMERSON ELECTRIC MFG. CO.

St. Louis 21, Mo.

Forced feed lubrication —spiral oil grooves in the rotor core and spiral oil conveyor attached to floating worm shaft continuously circulate oil over bearing surface.

Fingertip oscillation adjustment — simply "dial" any sweep, from 90° to stationary.

Send for the new 1954 Fan Catalog today. Ask for Catalog No. 785.

EMERSON ELECTRIC

FANS • MOTORS APPLIANCES

Southern Representative: JOHN D. HOMAN, 14 So. Orleans Ave., Tampa, Florida

Cut your Pump Room Costs
with
Durametallic
"Engineered For The Job"
Packings
The PERFECT SEAL
Write today for FILE No. DMSP describing the complete line of Durametallic wear-free packings.
DURAMETALLIC CORPORATION
KALAMAZOO MICHIGAN
MANUFACTURERS OF METALLIC and SEMI-METALLIC PACKINGS
ROTARY MECHANICAL SEALS and PACKING TOOLS

News (continued)

(*Starts on page 8*)

Fairbanks, Morse Opens New Kansas City Plant

FAIRBANKS, MORSE & CO., 600 South Michigan Ave., Chicago, Ill., officially opened its new pump manufacturing plant in KANSAS CITY, KANSAS, on May 19 and 20. The first day visitors were given a preview of the completely new and modern manufacturing works, including many new pump demonstrations. A special dedication program took place, with breakfast, luncheon and dinner provided at the Town House Hotel.

The second day was devoted to a technical forum on the problems arising from the increased use of water in the United States and the diminishing water supply. There were technical sessions on pumps, including reports on the latest developments on hydraulics, and a question and answer period in which outstanding engineers and leading hydraulicians took part. Dean Francis M. Dawson of the University of Iowa College of Engineering presided. Speakers included Dr. Richard G. Folsom of the University of Michigan, and Mr. Gail A. Hathaway from the War Department's office of the Chief of Engineers in Washington, D. C.

Airtemp Construction Opens St. Louis Office

RUSSELL M. HAGAN will head AIRTEMP CONSTRUCTION CORPORATION'S new ST. LOUIS office, located in the Title Guaranty Building.

A field engineer, Hagan joined Chrysler Airtemp last January at Dayton. He formerly was affiliated with Condaire, Inc., and the L. V. Fleiter Co., St. Louis, as a sales engineer. A native of St. Louis, he attended Washington University.

Opening of the new St. Louis office was one move in a large-scale expansion program now in progress at Chrysler Airtemp. The Airtemp Construction Corporation is a subsidiary of Chrysler Corporation's Airtemp Division, and co-operates with air conditioning dealers in handling major air conditioning projects that utilize central station equipment.

Quaker Names Van Buren

The appointment of W. H. VAN BUREN as Assistant General Sales Manager, Eastern Division Branches, QUAKER RUBBER CORPORATION, Divi-

sion of H. K. Porter Company, Inc., Philadelphia, has been announced.

Mr. Van Buren, a graduate of Rensselaer Polytechnic Institute in Mechanical Engineering, has been associated with the rubber industry for the past twenty-five years, joining Quaker in 1945. He became Manager of Belting Sales and assisted in setting up Quaker's V-Belt program and increasing conveyor belt sales.

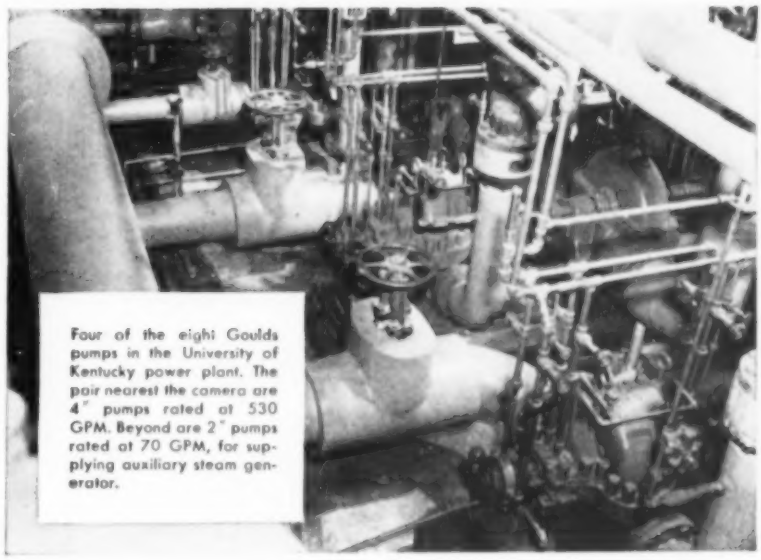
Mr. Van Buren will coordinate the sales program of Quaker's eight eastern branches located in ATLANTA, Boston, DALLAS, HOUSTON, Kearny, N. J., NEW ORLEANS, Philadelphia and Pittsburgh.

Reynolds Metals Labor-Management—Louisville

Production workers in REYNOLDS METALS COMPANY'S LOUISVILLE, KENTUCKY, plants have observed 20 years of harmonious labor-management relations by presenting a scroll expressing their appreciation to R. S. Reynolds, Sr., chairman of the Reynolds Metals board of directors and founder of the aluminum firm. David P. Reynolds, the firm's vice-president in charge of sales, accepted the scroll for his father, who was unable to be present.

The certificate of appreciation, citing the 20 years of harmonious relations between the company and its Louisville employees, told of the workers' appreciation for the company's contributions to a strong employment picture, and its manifestation of ". . . simple dignity and human spirit in its relationship with its employees."

Matt W. Davis, business agent of Aluminum Workers Local 19388, presents a scroll to David P. Reynolds, vice-president, Reynolds Metals at Louisville, Ky., celebration.



Four of the eight Goulds pumps in the University of Kentucky power plant. The pair nearest the camera are 4" pumps rated at 530 GPM. Beyond are 2" pumps rated at 70 GPM, for supplying auxiliary steam generator.

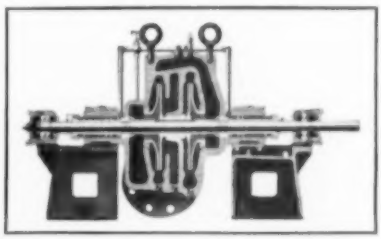
Boiler feed pumps TEACH STEAM PLANT ECONOMY

Doubling enrollment at the University of Kentucky meant increasing the load on the University's steam plant by 120,000 lbs. of steam per hour.

Failure of the steam plant would leave some 8,000 students and faculty without heat—and seriously cripple crucial scientific investigations. Obviously, reliability of equipment is essential. Flexibility, too—for economical operation during off-peak seasons. And, as space was limited, compactness was important.

Eight Goulds pumps for the new steam plant extension helped the University solve those problems. Four are 2-stage Fig. 3390 boiler feed pumps, supplying water to the steam generators at a head of 550 ft. The other four are condensate return and circulating pumps. All are compactly designed for minimum space requirements, and are precision-built for trouble-free operation and long service life.

Goulds pumps are available for every power plant application. Bulletin 722.3 gives detailed information and specifications of the popular Fig. 3390 boiler feed pump. We'll be glad to send you a copy or consult with you on any liquid-handling problem.



Cross-section of Goulds Fig. 3390 centrifugal pump, showing opposed impellers, water-cooled stuffing box, and other construction features which make it a thoroughly efficient pump. Available capacities up to 1000 GPM. Heads to 900 ft.

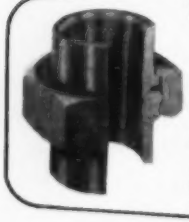
MEMBER

Goulds PUMPS INC.
Seneca Falls
New York

Catawissa PERFECT SEAL Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

A TYPE FOR EVERY USE!
FOR ALL PRESSURES!
FOR ALL TEMPERATURES!



Standard & Double Extra Heavy UNIONS

Available with screwed or socket weld ends. 3000-lb. sizes ⅛" to 4"; 6000-lb. sizes ⅛" to 2".

ORIFICE UNIONS

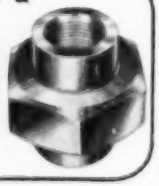
With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

MALE & FEMALE UNIONS

With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.

FULL STAINLESS & FULL ALLOY STEEL UNIONS

With screwed or socket weld ends. 3000-lb. and 8000-lb. service.



WRITE FOR CATALOG 11
Showing the Complete Catawissa line of Perfect Seal Products

CATAWISSA VALVE & FITTINGS COMPANY
950 MILL ST. • CATAWISSA, PA.

News (continued)

ASME Oil & Gas Power Conference — Kansas City

With a technical program planned to interest and benefit Pipe Liners, Power Plant Operators and all concerned with diesel, dual fuel and gas engines, the 26th Annual Conference and Exhibit of the Oil and Gas Power Division of ASME is scheduled in the Muehlbach Hotel, Kansas City, June 14-17.

Traveling Abrasive Show

THE CARBORUNDUM COMPANY is taking an actual demonstration of its abrasive products direct to its prospects and customers in a mobile unit. This "Abrasive Workshop" on wheels is touring industrial areas and showing just what its products can do—actual samples of various production components are ground and polished as they might be in an actual metal-working plant.

The traveling unit is manned by Carborundum experts that put on the demonstrations and answer questions. They are assisted at each stop by local district salesmen and distributors' salesmen. The recent 3-day showing in Atlanta was sponsored by J. M. Tull Metal Supply Company. Tull sent out advance invitations, and scheduled guest attendance at each one-hour showing to avoid overcrowding the mobile-truck show room.

Emphasis in Atlanta was on abrasive belts. These were demonstrated in many types of actual production machines—but Carborundum emphasizes that they do not make the grinding machines. They sell abrasives, and the purpose of the show is to demonstrate their own products.

Abrasive belts are emphasized because Carborundum believes they help the customer get the most for his abrasive dollar. Grinding wheels have lost none of their importance, but the belts are newer, and less well known.

Our editors left the show convinced that these abrasive belts really do a surprising job. They do not come apart, tear up, or quickly lose their grinding surface. An important element in this type of grinding is the landed rubber wheels on which the belt travels. Wheels come in various types for many types of jobs—and as always, selection must be correct. Both the rubber wheel and the abrasive belt must be suited for the task at hand.

Sound Design
Quality Materials
Precision Workmanship

the superiority of JERGUSON VALVES speaks for itself

OS&Y Valves for severe conditions

Rugged Jerguson OS&Y Valves are the ideal answer to meet high temperature or corrosive conditions where inside threads can't be tolerated. Efficient outside thread design eliminates possible freezing and allows the valve stem to work freely at all times.

GA Valves for instrument piping and general use

Tremendous time and cost savings are possible with Jerguson GA Valves. Threaded connections can be reduced from 10 to 3 . . . unions, nipples, reducers, elbows, tees, valve, and bleed valve are combined in one space saving unit.

Jacketed Heated-Cooled Valves

Designed especially for use with heated or cooled gages, Jerguson No. 93 Valves have a surrounding jacket for circulating the heating or cooling medium. They give safe, dependable, leak-tight service.

Globe Valves

Jerguson Globe Valves, furnished in ¼, ½, and ¾ inch sizes with renewable, regrindable seats. Can be furnished with Stellited stem and/or OS&Y.

All valves shown rated at 3000 lbs. @ 500°F. Send for detailed Data Units . . . or outline your requirements and let Jerguson engineers go to work for you.

JERGUSON
Gages and Valves for the Observation of Liquids and Levels
JERGUSON GAGE & VALVE COMPANY
100 Fellsway, Somerville 45, Mass.
Offices in Major Cities
Jerguson Tress Gage & Valve Co., Ltd., London, Eng.
Pétrole Service, Paris, France

Westinghouse Names Air Conditioning Div. Staff

Key appointments to the staff of the WESTINGHOUSE ELECTRIC CORPORATION'S new Air Conditioning Division were announced by John A. Gilbreath, division manager. Many of those named held similar positions in the air conditioning department of the Westinghouse Sturtevant Division, which was recently set apart as a separate division of the Company, and which will have headquarters at the new air conditioning plant now under construction at Staunton, Va.

Those named are: WILLIAM B. COTT, sales manager; JOHN L. DITZLER, engineering manager; CLIFFORD M. SAYRE, manager of manufacturing; CHARLES E. SMOYER, JR., manager of accounting; HAROLD L. GOEHRING, industrial relations manager; and JOHN C. FEICK, JR., purchasing agent.

Ryan of Stone & Webster Receives ESNE 1954 Award

The Engineering Societies of New England recently presented its New England Award for 1954 to WILLIAM F. RYAN at the organization's annual meeting held at the Museum of Science, Moss Auditorium, Boston. Mr. Ryan, who is engineering manager of STONE & WEBSTER ENGINEERING CORPORATION, received the award in recognition of his professional attainments.

G.E. Starts Virginia Plant

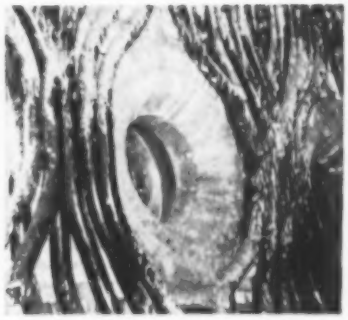
An "electronic handshake" was used to break ground at WAYNESBORO, VA., for a new GENERAL ELECTRIC COMPANY plant which will manufacture electronic controls for industrial and aviation use.

The unusual handclasp completed an electrical circuit between H. A. Brower, mayor of Waynesboro, and Dr. L. T. Rader, general manager of the G-E Specialty Control Department, each of whom held a "live" wire in his left hand. The weak electric current that passed through the human circuit was amplified by a resistance-sensitive relay (a device which will be produced at the new plant) thus activating the groundbreaking shovel.

Expected to be in full operation some time next year, the new plant will employ about 550 people. Facilities on the 70-acre site will include a large manufacturing area, warehouse, laboratory, personnel facilities, and modern offices.

BIG KENTUCKY STEAM BOILER USES "TEAM-WORK" REFRACTORY WALLS, PORTS, BAFFLES

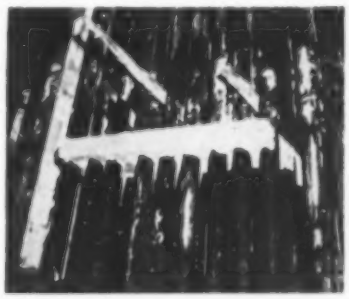
MASONS dip joints to speed laying up side walls of the boiler with ***IRONTON*** STEEL Fire Brick (High Duty).



BURNER PORTS of the boiler are special shape brick made of Ironton's uniformly high P.C.E. Kentucky flint clay.

Any boiler installation is bound to give better service when all the refractories are engineered to work together. That's why experts prefer Ironton "Reliable Refractories" made from Kentucky high P. C. E. clays. Whether it's standard series fire clay brick, special shapes, or the new castable and insulating refractory concretes, Ironton ASSURES coordinated performance under specified service conditions.

TECHNICAL BULLETINS on all the materials used in the job pictured here will be sent on request. Get in touch with the Ironton representative in the nearest southern city, or write to the Bulletin Secretary at Ironton.



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ASK FOR TECHNICAL BULLETINS ON NEW CASTABLES, SPECIAL SHAPES, "STEEL" BRICK

News for the South and Southwest (continued)

O. O. Rae of Atlanta Is New Westinghouse Vice President

WESTINGHOUSE ELECTRIC CORP. has announced the election of OTIS O. RAE of ATLANTA, GEORGIA, as vice president of the company.

Mr. Rae is a native of Augusta, and received a degree in electrical engineering from Georgia Tech in 1918. After serving with the Army Engineers for a brief period, he joined Westinghouse at East Pittsburgh in 1919, and has been with the company ever since.

Otis Rae

Mr. Rae was transferred to the Atlanta Office in 1922, and was appointed electric utilities manager in 1934. Since 1950 he has served as regional manager of the apparatus divisions. He will continue in that capacity with headquarters remaining in Atlanta.

Wheeling Corrugating Co. Promotes Lane & Stewart

WHEELING CORRUGATING COMPANY, WHEELING, W. VA., has announced two promotions within the Sales Department.

J. A. LANE has been appointed assistant to the vice-president. Mr. Lane began his career with the firm in 1930, when he joined the force at the Wheeling Factory. In 1936 he was transferred to the General Offices. During the past eight years he has served as manager of Wheeling Corrugating's Analytical Department.

A. F. STEWART has been appointed manager of the Market Research and Sales Analysis Division, succeeding Mr. Lane.

Stewart became associated with the Wheeling Corrugating Cost Department in 1936 and was later transferred to the Research and Metallurgical Department of Wheeling Steel. During the past seven years he has been a member of the Analytical Department of Wheeling Corrugating.

A-C Names Kucera, Atlanta

C. F. KUCERA has been appointed regional representative for transmission equipment in the Southeast regional office of ALLIS-CHALMERS General Machinery Division.

Kucera has been with the company since 1946 and was previously assistant sales manager in the firm's switchgear department. He is a member of the American Institute of Electrical Engineers. In his new post, his headquarters will be at ATLANTA.

Ustin Joins Buchanan

GEORGE USTIN has recently become associated with BUCHANAN ELECTRICAL PRODUCTS CORPORATION in the capacity of Chief Engineer, to spearhead an accelerated and considerably expanded product development program aimed at expansion of the Buchanan product lines, which include specialized electrical fittings for both contractor and industrial applications.

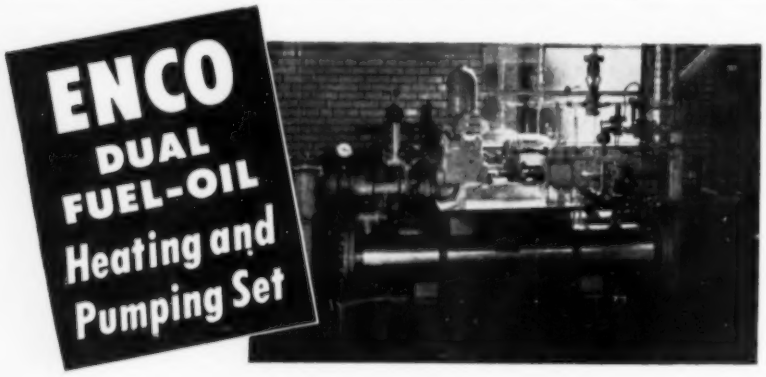
Warehouse Assn. Elects Sarran of Atlantic Steel

MILTON C. SARRAN, manager of ATLANTIC STEEL COMPANY'S Warehouse Division, ATLANTA, has been named president of the Southern Chapter, American Steel Warehouse Association. The election was held in conjunction with the annual meeting of the Southern Chapter in Birmingham.

Mr. Sarran has managed Atlantic Steel Company's Warehouse Division since it began operation in 1947. He has been with the company since 1933.

Other officers elected at the meeting are: regional vice-presidents JERRY WINTER, EDGCOMB STEEL COMPANY, CHARLOTTE, NORTH CAROLINA; POLLARD TURMAN, J. M. TULL METAL AND SUPPLY COMPANY, ATLANTA, and P. G. BANKER, MID STATE STEEL, INC., NASHVILLE, TENNESSEE. G. W. SMITH, of O'NEAL STEEL COMPANY, BIRMINGHAM, ALABAMA, was elected secretary-treasurer.

Re-elected were Frank Pidgeon, Pidgeon-Thomas Iron Company, Memphis, Tennessee, as national director, and Frank F. Rose, of Edgcomb Steel Company as publicity director.



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1. Completely automatic operation with temperature and pressure regulation.
2. All essential equipment—including safety valves as needed—in one compact unit.
3. Individually designed to meet the specific needs of the power plant.
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5. Pumps run at moderate speed. Heaters designed to give the correct viscosity and velocity without fouling.
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IN CANADA: ROCK UTILITIES LTD., 80 JEAN TALON ST. W., MONTREAL, P. Q.

General Dynamics—Atlanta

The Electro Dynamic Motor and Generator Division of the GENERAL DYNAMICS CORPORATION has named EDWIN R. CAMPBELL Southern Manager, with offices at 357 Foundry Street, N.W., ATLANTA, GA.

Mr. Campbell has had approximately seven years of experience in the power machinery, speed reducers and electric motor fields, as well as service in engineering consulting.

Saunders V.P. Texas Eastern

George T. Naff, president of TEXAS EASTERN TRANSMISSION CORPORATION, announced recently that J. B. SAUNDERS, JR., of HOUSTON, president of Triangle Refineries, Inc., has been elected vice-president of Texas Eastern.

Mr. Saunders was born in Hillsboro, Texas, and shortly thereafter moved to Sapulpa, in the heart of the Oklahoma oil fields. He has been active in the oil business since 1922.

FUTURE EVENTS
Of Engineering Interest

THE SOCIETY OF THE PLASTICS INDUSTRY, INC., Wm. T. Cruse, Exec. V. P., 295 Madison Ave., New York 17, N. Y.
June 6-11, Sixth National Plastics Exposition, Cleveland Auditorium, Cleveland, Ohio.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, C. E. Davies, Sec'y, 29 W. 39th St., New York 18, N. Y.
June 14-17, Annual Conference & Exhibit of the Oil and Gas Power Division, Hotel Muehlback, Kansas City, Mo.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, H. H. Henline, Sec'y, 33 W. 39th St., New York 18, N. Y.
June 21-25, Summer General and Pacific General Meeting, Hotel Biltmore, Los Angeles, Calif.

APPALACHIAN GAS MEASUREMENT SHORT COURSE, R. E. Hanna, Jr., Chm. Housing & Registration, West Virginia University, Morgantown, W. Va.
Aug. 23-25, 14th Annual Session, West Virginia University, Morgantown, W. Va.

INSTRUMENT SOCIETY OF AMERICA, Mg. Dir., First International Instrument Congress & Exposition, 845 Ridge Ave., Pittsburgh 12, Pa.
Sept. 13-21, First International Instrument Exposition, Philadelphia Convention Hall, Philadelphia, Pa.

PUBLIC UTILITIES ASSOCIATION OF THE VIRGINIAS, Robert W. McKinnon, Exec. Sec'y, 5 Franklin Road, Roanoke, Va.
Sept. 16-18, Thirty-Sixth Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, Harold M. Furtney, Chm. Tulsa Section, 1610 E. 32nd Place, Tulsa 5, Okla.
Sept. 27-29, Electrical Conference for the Petroleum Industry, Mayo Hotel, Tulsa, Okla.

PETROLEUM ELECTRIC POWER ASSOCIATION, W. L. Pearson, Sec'y-Treas., P. O. Box 1261, Amarillo, Texas.
Oct. 4-6, Twenty-Sixth Anniversary Meeting, Jung Hotel, New Orleans, La.

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Niagara District Engineers in Principal Cities of U. S. and Canada

News for the South and Southwest (continued)

Exide—West Texas

SOUTHWESTERN ELECTRIC SUPPLY COMPANY, 818 Ave. G, LUBBOCK, TEXAS, has been appointed a distributor of Exide Lightguard emergency lighting equipment, according to a recent announcement by O. L. Robertson, Dallas branch manager of THE ELECTRIC STORAGE BATTERY COMPANY.

Southwestern will represent the battery firm's line in Lubbock and the Texas Panhandle. J. E. JEFFREYS and W. R. MCCASKILL are partners in the firm, which also sells for Appleton Electric Company, Federal Electric Products, Sylvania Electric Products, Inc., Triangle Conduit and Cable Company, and Square D Company.

Allis-Chalmers, Albany, Ga.

THE ALBANY ELECTRIC SUPPLY CO., 929 Roosevelt Ave., ALBANY, GEORGIA, has been named a distributor for ALLIS-CHALMERS control equipment in 13 counties in the state.

Principals in the concern are DUPONT DOUGLAS STROUD, president, and ARNOLD GEESLIN, secretary-treasurer and sales manager.

New Florida Plant for Southeastern Instrument

SOUTHEASTERN INSTRUMENT COMPANY has started manufacturing operations at a new plant located at 1110 North East 8th Ave., FORT LAUDERDALE, FLORIDA. The new building provides about 12,000 sq ft of plant facilities.

The firm, a wholly owned subsidiary of Revere Corporation of America in Wallingford, Conn., engages in the design, engineering and manufacturing of component parts for aircraft fuel systems.

THOMAS BALL, JR., president of Southeastern, said the growth of the aircraft industry in the South has called for the establishment of the plant in Fort Lauderdale to provide better service in this region.

Blaw-Knox Names Weil Southern Representative

FRANK A. WEIL has been appointed southern representative for BLAW-KNOX COMPANY'S Chemical Plants and Buflovak Equipment Divisions. He will be located in the Birmingham office and will serve ALABAMA, FLORIDA, GEORGIA, MISSISSIPPI, and SOUTH CAROLINA.

Frank A. Weil

Mr. Weil has been with the Chemical Plants Division for seven years as principal process engineer and supervisory process engineer. Previously he was with DuPont.

NEWLY DESIGNED TRAP

virtually eliminates maintenance!

Most striking feature of this trap is its simple design. Only one moving part—a solid stainless steel disc—virtually eliminates maintenance.

The trap is small, easily installed, immune to water hammer, vibration and corrosive elements. Uses same valve seat and head for all pressures to 600 psi and temperatures to 950°F.

Check these advantages to your own satisfaction. Write today for a free trial trap giving size, capacity and pressure conditions.

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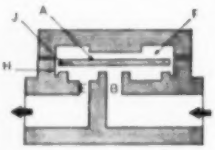

HOW IT WORKS!

Air and/or condensate raise valve seat disc A, discharge thru E. When steam follows, greater velocity causes it to strike body at H thus building up pressure in chamber F. This causes disc to seat, closing tube B. As pressure in F decreases by condensation and leakage thru slot J, pressure in tube B raises disc and cycle is repeated.

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See the effect of increasing loads on wiring *right at the spot!* Direct reading meter indicates percentage voltage drop on 115 or 230 volt circuits under load *without troublesome calculations.*

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49 Marshall Street, North Adams, Massachusetts

SPRAGUE

PIONEERS IN ELECTRIC and ELECTRONIC DEVELOPMENT

Roper Names Rier—Tenn.

THE GEO. D. ROPER CORPORATION has announced the appointment of ROBERT J. RIER of MEMPHIS, TENNESSEE, as District Sales Manager.

Robert J. Rier

Mr. Rier will represent in a territory comprising Colbert and Lauderdale counties in Alabama, the state of Mississippi and the Western portion of Tennessee. He has had broad engineering training and has worked with industrial supply houses prior to becoming manufacturers' representative for the Roper Rotary Pump line and several other related equipment lines.

Continental Electric Eqpt. Names Nelson—Baltimore

CONTINENTAL ELECTRIC EQUIPMENT COMPANY, Cincinnati, Ohio, has announced the appointment of MURRAY C. NELSON as regional manager with headquarters at 500 Kingston Road, BALTIMORE 29, MARYLAND. Mr. Nelson's territory includes Maryland, the District of Columbia, and Virginia.

His previous experience includes employment with Westinghouse Electric Corp., Geo. H. Wahn Company, and Bulldog Electric Products. Former president of the Electrical Manufacturers Representatives Assn. of Baltimore, he also organized the Electrical Manufacturers Representatives Assn. of Virginia, and is an active member of the Engineers Club of Baltimore.

Knowles Joins Trane—Va.

THE TRANE COMPANY, manufacturing engineers of air conditioning, heating, ventilating and heat transfer equipment, announce the association of ROBERT S. KNOWLES with the RICHMOND, VA., sales office as a sales representative.

Knowles, an engineering graduate of The University of California, has been associated with the company since 1946.

50th Anniversary for A-C Steam & Hydraulic Turbines

This year marks the 50th anniversary of ALLIS-CHALMERS entry into the steam and hydraulic turbine business. And, typical of many of the periods in the company's 107-year history, 1954 will see significant advancements in these products for the power field.

Production has started on the first of two 100,000 kw, 3600 rpm steam turbines with supercharged generators for delivery in 1955 to a midwestern utility. In addition, a complete line of single-shaft steam turbine-generator units has been carried to 200,000 kw, 3600 rpm. And recent completion by the company of the world's first close-coupled, cross-compound unit, rated 120,000 kw, has set a practical pattern for giant future steam turbine units to 500,000 kw ratings.

John W. Parker & Associates Form New Company—Atlanta

JOHN W. PARKER, JR., formerly connected with the Leo S. Bosarge Company, now heads up a firm of manufacturers' representatives and sales engineers, under the name of John W. Parker and Associates, with headquarters at 815 Bona Allen Building.

W. E. SULLIVAN, also formerly with the Bosarge Company, is affiliated with Mr. Parker.

Books for the Plant Engineer

Economical Operation of the Small Steam Plant

PUBLISHED BY BITUMINOUS COAL RESEARCH, INC.
2609 First National Bank Bldg.,
Pittsburgh 22, Pa.
12 pages
Price, 50¢

This pamphlet explains how small steam plants can be operated economically; and discusses fuel purchase policy; coal and ash handling; stoker firing; boiler efficiency; automatic controls; water treatment and feedwater heating; insulation; maintenance; and starting up and shutting down procedure. It is illustrated with photographs and line drawings.

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WHAT'S NEW and Where to Get It

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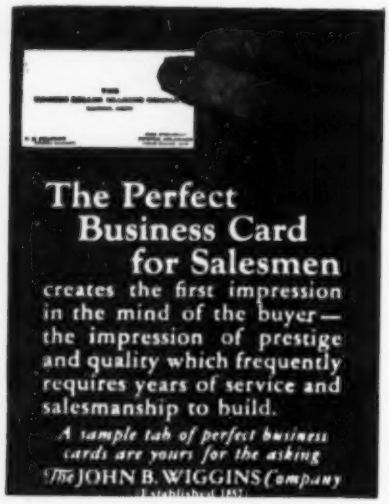
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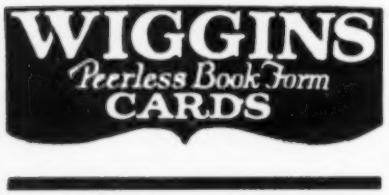

R-1 **FLOOR TRUCKS**—Bulletin 50-A, 6 pages—Illustrates and catalogues a variety of industrial floor trucks for plant requirements in materials handling, with all models featuring versatile performance, quicker loading, smooth wheeling, easier steering, and manpower conservation.—TOWSLEY TRUCKS, INC., 1766 Elmore St., Cincinnati 23, Ohio.

R-2 **POWER TRANSMISSION EQUIPMENT**—Catalog—Form 118, 24 pages—Covers complete line of variable speed equipment from fractional horsepower to 8 hp with a maximum speed ratio of 10:1 at 1750 rpm. with no stops required for speed changes. Chapters cover variable speed pulleys; wide V-belts; sheaves; motor bases; countershafts; and Select-O-Speed transmission.—LOVEJOY FLEXIBLE COUPLING COMPANY, 4945-4999 West Lake St., Chicago 44, Ill.

R-3 **NOISE CONTROL**—Bulletin No. 250—Describes a new and improved Snubber series, designed for more effective control of noise from internal combustion engines with construction design for greater safety. Ten models are included in the new series. Illustrated.—BURGESS-MANNING COMPANY, 1203 Dragon St., Dallas, Texas.

R-4 **WATER TREATMENT FOR COOLING TOWERS**—Bulletin 28X7501A, 6 pages—Discusses types of cooling systems, and covers such problems as corrosion of metal surfaces; inorganic scaling; organic growths such as algae and bacterial slime; and delignification of the wood in the tower. Selection data included.—ALLIS-CHALMERS MANUFACTURING COMPANY, 954 S. 70th St., Milwaukee, Wis.

R-5 **PREHEATER TUBES**—Catalog No. 3154, 4 pages—Describes Vitralloy tubes—light wall electric welded steel tubes protected on inside by coating of boro-silicate compound fused onto surface of tubes in coatings at 1550 F. to offer corrosion-proof surface, abrasion resistance, high temperature protection, and other advantages.—BARROWS PORCELAIN ENAMEL COMPANY, Langdon Road and Penn. RR, Cincinnati 13, Ohio.

R-6 **GASKET CUTTER**—Bulletin, 4 pages—Illustrates and describes the Spearhead Gasket Cutter, an all-purpose cutting tool which cuts any shape precision size gaskets from any pliable sheet materials. Sizes, prices, and other ordering information included.—ZIMMERMAN PACKING COMPANY, Cincinnati 12, Ohio.

R-7 **FLAT TRANSMISSION BELTS**—Bulletin, 4 pages—Features flat transmission belts and lists recommended uses; specifications; construction data; sizes and lengths. Illustrates types available for various applications.—QUAKER RUBBER CORPORATION, Division of H. K. Porter Co., Inc., Tacony and Comly Sts., Philadelphia 24, Pa.

R-8 **LIFT TRUCKS**—Catalog, 20 pages—Describes complete line of lift trucks, including construction features, specifications, sizes available; line drawings, diagrams, equipment photographs, and illustrations of specific plant applications.—LIFT TRUCKS, INC., 2425 Spring Grove Ave., Cincinnati 14, Ohio.

R-9 **FLEXIBLE COUPLINGS**—Catalog Form No. 1009, 20 pages—Shows line of flexible couplings in sizes and types for every service; gives types and materials, specifications and dimensions; operating capacity; ordering data; prices. Illustrated with photographs of equipment.—LOVEJOY FLEXIBLE COUPLING CO., 4949 West Lake St., Chicago 44, Ill.

R-10 **EMERGENCY CLOSING DEVICE**—Bulletin 71B8105, 4 pages—Describes a portable "Pneu-Draulic" safe emergency closing device for use with standard air magnetic circuit breakers in metal-clad switchgear, designed to insure adequate closing speed of breakers during loss of control power.—ALLIS-CHALMERS MANUFACTURING COMPANY, 954 S. 70th St., Milwaukee, Wis.

R-11 **MOISTURE CONTROL IN COMPRESSED AIR**—Brochure, 4 pages—Discusses types and quantities of impurities and methods for their removal, including the Vi-Speed method, units, and dessicant, for providing clean, dry air for use in industrial applications.—VAN PRODUCTS CO., 3773 W. 12th St., Lakewood, Erie 2, Pa.

R-12 **FACTORY ASSEMBLED POWER PLANTS**—Catalog SB-51, 16 pages—Illustrates and describes factory assembled water tube steam generators, delivered ready to go to work. Includes specifications, diagrams, photographs of components and complete unit, and other pertinent data.—ERIE CITY IRON WORKS, Erie, Pa.

R-13 **BUILDING MAINTENANCE**—Folder, 6 pages—Tells how to solve floor problems, how to patch or overlay concrete areas that have been ruined by acid, grease, oil, or excessive wear; how to harden concrete surfaces; how to prevent water seepage and leaks in basements; how to seal roof leaks; and other useful maintenance suggestions.—STONHARD COMPANY, 1306 Spring Garden St., Philadelphia 23, Pa.

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A PLASTIC LINING USED IN PLACE OF FIRE BRICK
LONGER LASTING BOILER FURNACES
Boiler furnaces lined with CARECO last two to four times longer than those lined with fire brick. Write for quotation.
CAROLINA REFRACTORIES COMPANY
HARTSVILLE, S. C.

FUNDAMENTALS OF BOILER PLANT ENGINEERING
(Basic Principles of Steam Plant Practice)
By A. D. HOLLAND
Assoc. Prof. of Mech. Engr., Georgia School of Technology

"Fundamentals of Boiler Plant Engineering"—is different from most handbooks in that it goes into the fundamental principles of boiler plant operation. It is written so that it can be studied by those who have not had an opportunity to learn these basic laws; at the same time its many charts, tables and formulae make it a valuable reference book for the trained engineer.

The basic principles covered in this book have such wide application that it will be extremely helpful to refrigeration, air conditioning, textile and hydraulic engineers and master mechanics. Stiff cover, cloth binding, 4½ x 7 inches, 232 pages, 37 tables, 55 illustrations, 30 memorandum pages for your special notations. "FUNDAMENTALS OF BOILER PLANT ENGINEERING" may be secured with a 3-year subscription to SOUTHERN POWER & INDUSTRY for $3.00.

Take advantage of this special offer while it lasts. Write today to

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806 PEACHTREE ST., N.E. ATLANTA 5, GEORGIA

WHAT'S NEW and Where to Get It (continued)

R-14 **WEDGE GATE VALVES**—Bulletin 107—Covers iron body wedge gate valves; describes service applications and gives details of construction. Shows Outside-Screw-and-Yoke and Non-Rising Stem models and lists working pressures.—KENNEDY VALVE MFG. CO., Elmira, N. Y.

R-15 **HEAT RECOVERY**—Bulletin WC-114, 8 pages—Tells how to save boiler plant fuel and labor costs by means of continuous boiler blow-off heat recovery equipment. Includes charts, curves, and typical calculations to compute savings in Btu. Illustrated with photographs. GRAVER WATER CONDITIONING CO., Division of Graver Tank & Mfg. Co., Inc., 216 W. 14th St., New York 11, N. Y.

R-16 **BLOW-OFF VALVES** — Bulletin B-426, 20 pages — Covers Yarway Seatless blow-off valves and Yarway Double-Tightening blow-off valves, including installational recommendations, construction details, and prices. — YARNALL-WARING COMPANY, Mermaid Lane, Philadelphia 18, Pa.

R-17 **VALVES**—Catalog No. 207, 24 pages —Pressure regulating and relief valves are catalogued, with information for valve selection, capacities, dimensions and weights, applications, and related equipment. SCHADE VALVE MANUFACTURING CO., 2527 N. Bodine St., Philadelphia 33, Pa.

R-18 **AIR PREHEATERS** — Booklet, 36 pages—"The Ljungstrom Air Preheater" explains fuel savings and increased performance possible by using waste heat in flue gases to preheat incoming combustion air. Explains operation and construction of gas-to-gas preheater of the continuous regenerative type.—AIR PREHEATER CORPORATION, 60 E. 42nd St., New York 17, N. Y.

R-19 **PARTS CLEANING MACHINES**—Bulletin, 4 pages — Describes new models of Turbo-Blast parts cleaning machines, which combine physical force, chemical detergency, and heat. Gives specifications. Illustrates models available, and includes application data.—STORM-VULCAN INC., 2225 Burbank, Dallas, Texas.

R-20 **INDUSTRIAL FLOORING**—Folder 4 pages—Introduces a new industrial concrete flooring process called "Metal-Seeded Dynapakt." Describes method of operation with special power equipment for adhesion of concrete and metal-chip composition to obtain protective surface over fresh concrete topping.—FLASH-STONE COMPANY, 3723 Pulaski Ave., Philadelphia 40, Pa.

R-21 **FITTINGS & PIPING**—Catalog, 304 pages—Data and specifications on complete line of controlled quality seamless welding pipe fittings; forged ASA flanges, large diameter and TEMA flanges; screwed and socket welding fittings. Technical data section features convenient tables and charts to assist in solution of piping problems.—LADISH CO., Cudahy, Wis.

R-22 **LIQUID LEVEL INDICATORS**—Bulletin WG-1824, 20 pages—Complete description of the Yarway Remote Liquid Level Indicator, with application and installation recommendations and wiring diagrams, for use with boilers, heaters, storage tanks and other vessels in power and industrial process plants.—YARNALL-WARING COMPANY, Chestnut Hill, Philadelphia 18, Pa.

R-23 **ADDITIVES AND CLEANERS** — Bulletins 601, 602, 603, 604—First two leaflets describe multi-purpose additive for fuel oils; others cover cleaning and degreasing agents for industrial applications. Illustrated.—THE SHALER COMPANY, Waupun, Wis.

R-24 **STEAM TURBINES**—Catalog No. 500, 16 pages—Complete data on improved D-H horizontal and vertical turbines; gives details of design and construction changes and improved performance. Includes hand valves, carbon ring packing glands, governor valves, bearings and trip valves.—DEAN HILL PUMP CO., Indianapolis 7, Ind.

R-25 **STEAM TRAPS**—Condensed Bulletin 154, 4 pages — Discusses construction; gives complete tables of specifications, pressures, weights, and list prices. Includes safety features and technical data. Illustrates models available for industrial applications.—THE V. D. ANDERSON COMPANY, Steam Specialties Division, 1935 W. 96th St., Cleveland 2, Ohio.

R-26 **UNIONS & SWING CHECK VALVES**—Catalog 11, 24 pages—Complete engineering data and specifications on Catawissa Perfect Seal line of hot forged steel pipe unions and swing check valves. Special section is devoted to Double-Staff Unions, which provide 280% faster opening and closing.—CATAWISSA VALVE & FITTINGS COMPANY, Catawissa, Pa.

R-27 **JACKETED VALVES** — Units 220 and 221, 2 pages each—Describe operational features of jacketed valves for heated-cooled gages or wherever small jacketed angle valves are required. Full specifications; cutaway views showing internal construction. — JERGUSON GAGE AND VALVE COMPANY, 80 Fellsway, Somerville 45, Mass.

R-28 **DUPLEX TUBES**—Technical Bulletin No. 1954, 14 pages—Explains use of Duplex tubes for heat exchangers and condensers in industries and process plants handling corrosive liquids, gases, refrigerants, and circulating waters. Covers design, construction, and application.—BRIDGEPORT BRASS COMPANY, Bridgeport 2, Conn.

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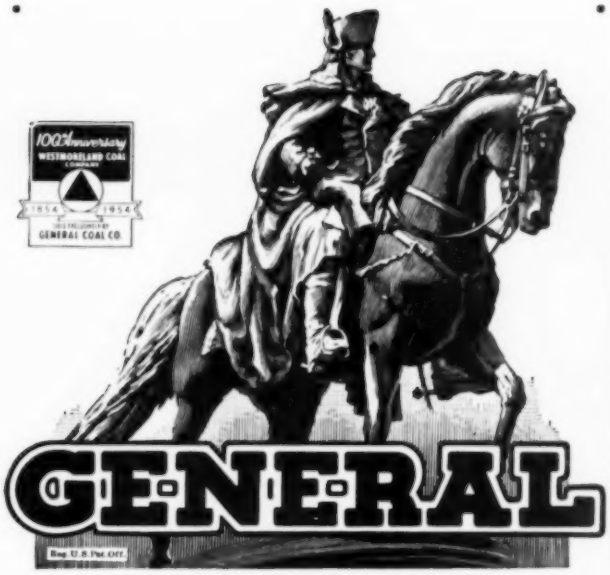

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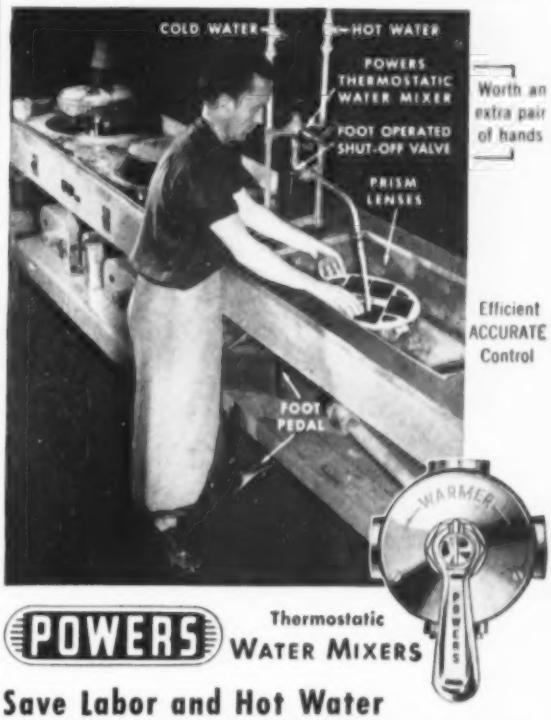

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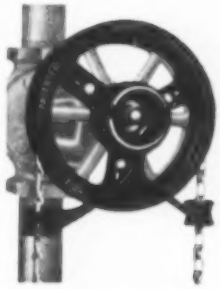

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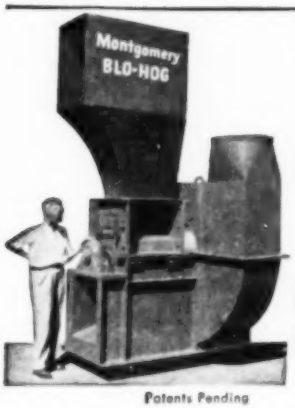

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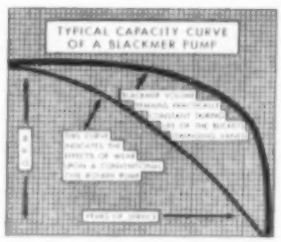

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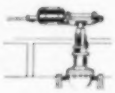

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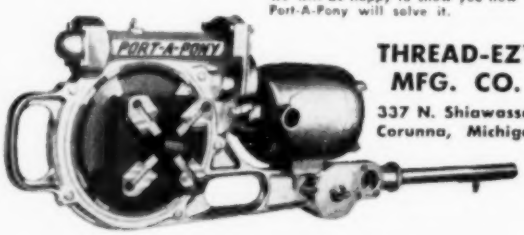

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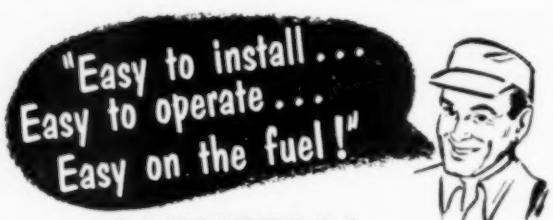

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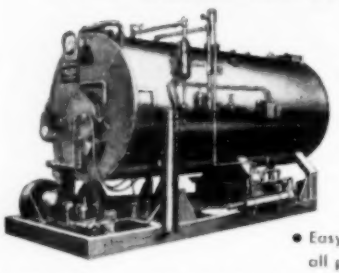

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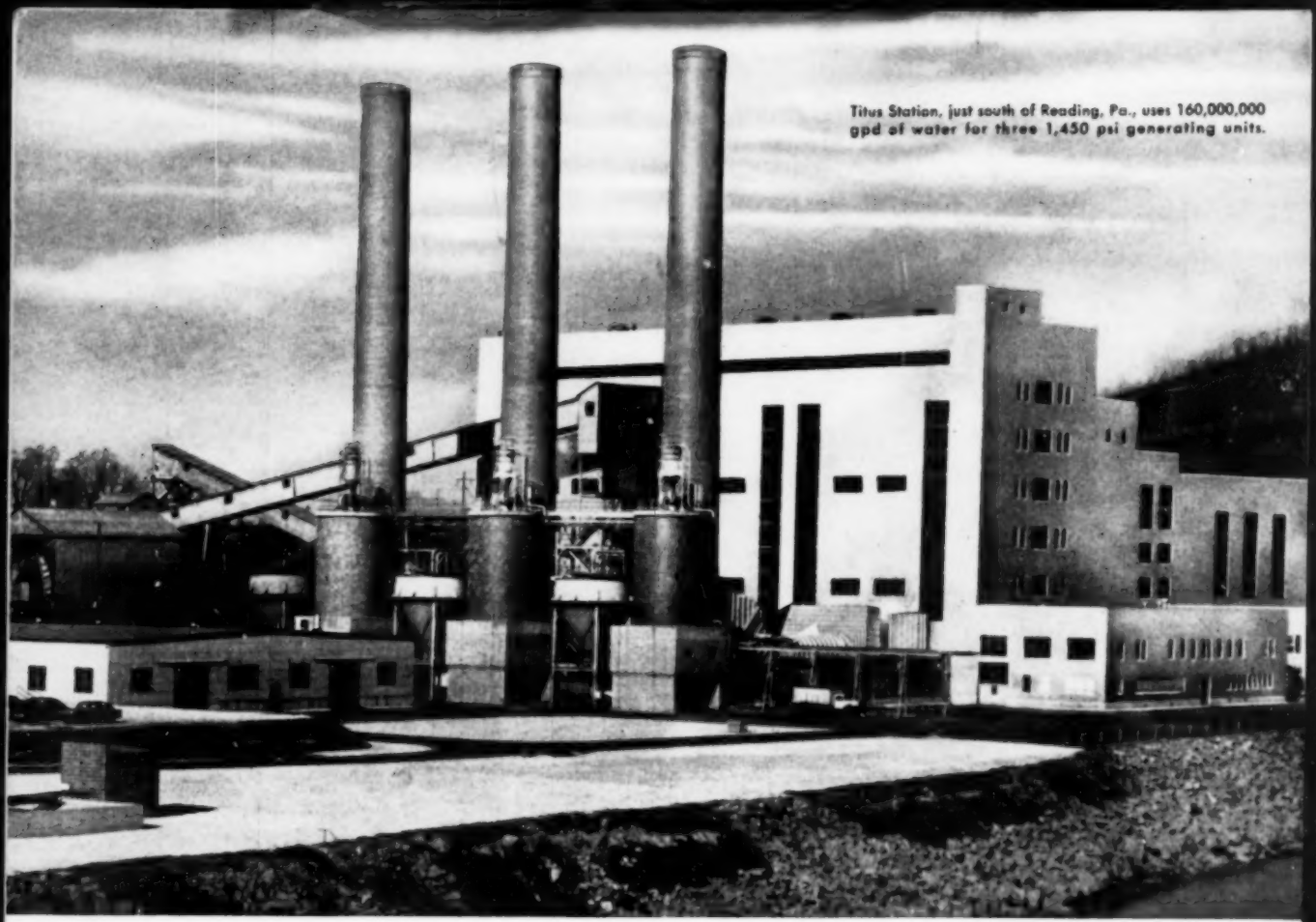

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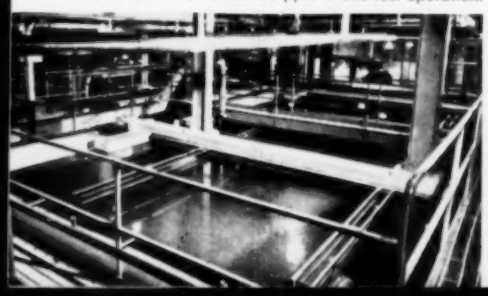

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